THE MEDICAL NEWS.

A WEEKLY JOURNAL OF MEDICAL SCIENCE.

VOL. 84. NEW YORK, SATURDAY, APRIL 30, 1904. NO. 18.

ORIGINAL ARTICLES.

THE SYMPTOMATOLOGY, DIFFERENTIAL DIAGNOSIS AND COURSE OF BRONCHOPNEUMONIA IN CHILDREN.*

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IN presenting these observations on the most frequent disease of infancy and early childhood, I do so, not in the hope of adding anything that is novel to the knowledge of the subject, but principally in order to set boundaries, as well-defined as may be, about the discussion that is to follow. For which reason I may be excused for dwelling somewhat at length on a working definition, or rather description of bronchopneumonia.

Three varieties of pneumonia, exclusive of tuberculosis, are commonly met with at autopsies on children, representing, as it seems to me, three powers of resistance to the invasion of the pulmonary structure by pathogenic organisms. First, hypostatic pneumonia, the pneumonia of the least resistant of the marantic, those wasted by long-continued disease, the pneumonia of the weakening heart. Second, bronchopneumonia, the pneumonia of the more resistant child, who is, however, still physically handicapped by reason of age, surroundings, bad air, improper food and previous illness. Third, lobar pneumonia, the pneumonia of the most resistant, of the child usually over three years of age, in previously robust health, non-catarrhal, non-rachitic, infrequently a tenement-house dweller, rarely an inhabitant of an institution, the primary benign pneumonia of so-called good private practice.

With the first variety we have nothing to do; it represents but the final stage in a feeble struggle for life, long destined to be futile. It is rarely of importance clinically, and infrequently diagnosticated during life. The third variety, lobar pneumonia, received ample attention at our last session, somewhat at the expense of the more important disease.

Bronchopneumonia is essentially a disease of the poor and unfortunate. It must be studied in great part in dispensaries, tenement houses and infant asylums. In the latter, especially when coming in the wake of epidemics of the various infectious diseases, it constitutes a veritable scourge.

While it is undoubtedly true that the child of the institution and tenement is somewhat more frequently exposed to the action of the micro-organisms which are the cause of this disease, yet when we consider how omnipresent are these same organisms at certain seasons of the year, this fact alone cannot be held accountable for the immense preponderance of cases of bronchopneumonia occurring amid these surroundings.

It is not in the germ, but the character of the tissues upon which it is implanted, that we must seek an explanation of this fact. What are the factors which go to render a child susceptible to bronchopneumonia? Briefly they are, insufficient fresh air and sunlight, improper food, or food not adapted to individual needs; unsuitable clothing; health impaired by previous illness, and lack of attention to pathological conditions of the upper air passages. These factors, wholly or in part, are present even in the best conducted institutions, and in all tenement houses. The results are rachitis, anemia, chronic nasopharyngeal catarrh, and chronic gastro-intestinal disturbances, which collectively serve to distinguish the ready victim of bronchopneumonia.

For the purposes of this discussion I have analyzed somewhat carefully 167 cases of so-called primary bronchopneumonia, believing that the clinical picture in primary cases is more characteristic than in those which are classed as secondary. They occurred at the New York Foundling Hospital during the past three years, and in no instance were complications of one of the exanthemata, diphtheria or whooping-cough. What proportion was due to influenza it is not possible to say, nor is it always easy to determine whether the severe enteric symptoms of some of the cases were an indirect cause or result of the pulmonary lesion. Many developed outside of the institution to which they were brought by their foster mothers, generally from tenements, for hospital treatment. Of these the histories are necessarily defective. The number analyzed represents but a fraction of the cases of bronchopneumonia actually occurring at this institution during this time, the great majority being classed as complications of the infectious exanthemata, diphtheria or whooping-cough, or only appearing upon the autopsy records, the pulmonary lesions not having been noted during life, or deemed of insufficient clinical importance, in the presence of the overshadowing primary disease, to merit special mention in the clinical records.

It must not be forgotten that it is exceptional at this institution to find at autopsy, lungs which are free from pneumonic lesions, for which reason it would obviously be absurd to class all cases in which these are found as those of bronchopneumonia.

While the number of cases analyzed is a somewhat small one from which to draw general con-

*Read before the Pediatric Section of the New York Academy of Medicine, Jan. 14, 1904.

clusions, as the deductions correspond very closely to those drawn from a much greater number, they are of value as showing the conditions existing in institutions at present, and during the immediate past.

Bronchopneumonia is essentially a secondary or complicating disease. One-third of the cases are generally set down as primary, a proportion which would seem a good deal too large, in so far, at least, as it relates to institutions. In the latter, the milder catarrhal affections of the upper air passages are generally overlooked; acute coryza, tracheitis, and even bronchitis of the larger tubes and mild influenza does not, in my experience, call for especial attention from a resident physician or nurse, provided the patient is not particularly ill, the consequence is that when the child is first examined, the signs of pneumonia are often well developed, and if they have not followed one of the severe, acute, infectious diseases, the case is classed as primary. If more careful observations were made upon institution children, from the time they developed a so-called "cold" with fever, the number of cases of bronchopneumonia, which are now classed as primary, would be materially reduced.

Occurrence.—Bronchopneumonia, unlike lobar pneumonia, occurs at all seasons of the year; thus in the list of cases referred to, somewhat less than one-third occurred in both winter and spring, about one-fourth in the fall, and about one-eighth in the summer quarter, or two-thirds of the cases between December and May. Males are somewhat more frequently attacked than females, 96 to 71, about five to four. As there is a slight preponderance of males at the Foundling Hospital, the fact is not noteworthy, although this is the proportion usually given, and is difficult to account for.

Of 147 cases in which the age was stated, over 58 per cent. occurred in children under one year of age; 20 per cent. from the first to the second year; 13 per cent. from the second to the third year; and 9 per cent. in those over three and under five. In other words, 70 per cent. of the cases were in children under two years of age.

Causes.—The indirect causes have been sufficiently indicated. The direct causes are exposure to cold, extension of an inflammation from the upper air passages downward, the acute infectious diseases, diarrheal diseases, or any factor which still further diminishes the feeble resisting power of the child to pulmonary organisms.

Symptoms.—There is no disease more irregular in its course and uncertain in its outcome than bronchopneumonia, on account of the variety of bacteria which either singly, but much more often in combination, are responsible for the pulmonary lesion and also to the varying amount of lung involved, and the greater or less resistance shown by the patient to the action of the toxins.

There is often a history of previous good health, or of acute catarrhal trouble of the upper air passages, moderate or severe bronchitis, convalescence from an acute infectious disease, or exposure to cold. Whether the pneumonia develops during the course of an acute infectious disease, in convalescence from it, or while the child is in its usual state of health, the onset is invariably sudden, and is ushered in in one of several ways; the child becomes apathetic, ceases to play, refuses to nurse properly, or is irritable and restless. Vomiting occurred six times in 56 cases of which I could obtain the history of onset; convulsions in five; chills were noted in two cases; there is generally more or less cough, and the bowel movements are frequently loose and green in color; the skin is hot, the respirations are increased in frequency, the pulse is rapid; the child when disturbed does not cry in a normal way; the cry is curtailed and ends abruptly, as though the expiratory effort caused pain or discomfort; the rhythm of respiration is disturbed; the pause which in health occurs after expiration is lost, and instead occurs after inspiration; the child inspires, holds its breath, and lets it out with a characteristic grunt, and immediately inspires again, possibly another indication that expiratory effort causes discomfort or pain.

Physical Examination.—The temperature will be found elevated four or five degrees or more, the respirations forty or more to the minute, the pulse 120 or over, the ratio of the respiration to the pulse, which in health is one to four, invariably approaches one to three, or less, or even one to two; in the more severe cases there is marked retraction at the epigastrium and about the clavicles, the alæ nasi expand and there may be more or less cyanosis seen in the lips and finger tips; the face is sometimes flushed, often pale.

On palpation the coarse râles of bronchitis are transmitted to the touch, or the cry may show unequal intensity of transmission on the two sides, especially at the bases or apices.

Percussion, which should be performed very lightly, the stroke sharp and quick, is of minor diagnostic importance in the early stages of the disease. Dulness may be elicited when there is marked congestion at the bases, or when the areas of consolidation involve a greater part of a lobe.

Auscultation is by far the most important factor in arriving at a diagnosis in the early stages. With the presence of a general bronchitis, coarse, moist râles are heard over a greater part of the chest, or only between the scapulæ and below the clavicles. Subcrepitant and fine râles, emanating from the finer bronchi and air vesicles, should be diligently sought for, as taken in connection with the symptoms described, they are conclusive proof of involvement of the terminal bronchi or air vesicles, or of pulmonary congestion. They may be very generally distributed, but are more often heard only over small areas, at one or both bases near the spine, in the axillæ, or at the apices. They may be heard constantly, or only when the child is induced to take a deep inspiration, as after crying, or an attack of coughing. Early in the disease there is usually no change in the character of the respiratory sounds. Over areas of consolidation of considerable extent

there may be exaggerated, diminished, or bronchovesicular breathing, the latter distant or intense, depending upon the proximity of the area to the chest wall, the condition of the lung overlying it, whether or not emphysematous, and the presence or absence of pleuritic involvement.

Finally, it must not be forgotten that considerable areas of consolidation may be found at autopsy, of which, during life, there was no evidence other than the presence of a few râles, and even these may have been absent. The physical signs may all be delayed for several days, or may be entirely absent during the whole course of the illness. Again, it not infrequently happens that the signs of consolidation are first recognized just before defervescence takes place.

Course of the Disease.—In the typical cases the fever rises rapidly to 104° F. or over, and continues with morning remissions of two or three degrees for a variable number of days. In my list of cases the average duration in those that recovered was thirteen to fourteen days; in five cases four days or less; it may continue for one or two months with the development of chronic changes in the lungs; in children of low vitality the disease may run its course practically without fever; and again the remissions of temperature may be very marked. The latter is especially true of cases in which the influence of the streptococcus predominates; in cases which recover the general trend of the temperature is downward after two or three days; in fatal cases the temperature of each day is a little higher than that of the preceding, the highest point being reached just before death, or it may rise suddenly to 106° or 108° F., and death take place in twelve to twenty-four hours; the fever falls by a more or less gradual lysis, exceptionally by crisis, which occurred but nine times in 167 cases.

The pulse is at first rapid and of good force; later in the disease rapid and feeble; as already stated, it constantly bears a ratio to the respiration of three to one, or less. The character of the respirations has been described; they vary in frequency from 40 to 100 or more a minute; they may occasionally be suspended for a considerable time, or be of the Cheyne-Stokes variety.

Cough may be entirely absent, it is often persistent and nagging; generally dry in character, or a large amount of mucus may be raised and swallowed. Suppression of the cough is seen in fatal cases.

Vomiting, after the disease has once begun is not frequently seen; on the other hand, the bowels as a rule show evidence of disturbed digestion; the movements are frequent, green in color, and contain more or less mucus. Catarrhal conditions of the enteric tract are common, especially in the cases occurring in the summer months. Gaseous distention of the intestines is often seen and may be so severe as to seriously interfere with the already embarrassed respiration.

Nervous System.—Stiffness of the neck and shoulders is marked in many epidemics; there may be intermittent spasm in groups of muscles. Delirium occurs in older children, convulsions after the first onset, usually only in the rachitic and in fatal cases. The tâche cérébrale and Kernig's sign are occasionally seen.

It is unnecessary to dwell at length on the symptoms of those cases which arise in the course of the acute infectious diseases. But for the fact that they are often obscured by the symptoms of the primary disease and of their usually greater severity, they do not differ essentially from those just described.

Diagnosis.—When a child under three years of age becomes suddenly and gravely ill, bronchopneumonia should always be thought of, even if the symptoms referable to other organs, as the brain and intestines, serve to draw the attention from the lungs; or if in the course of convalescence from an acute infectious disease, the temperature is suddenly elevated, the pulse and respiration increased in frequency, bronchopneumonia is by far the most probable cause.

The diagnosis is based on the acute onset in primary cases, the aggravation of all symptoms in secondary cases; in primary cases on the changed demeanor of the child and evidence of toxemia, fever continued over thirty-six hours with increase of respiration and pulse, and most important of all, the disturbance of the respiration, pulse ratio and the presence of fine râles, especially if localized, and occasionally a change in the respiratory sounds. Cough is not an essential.

Differential Diagnosis.—Fever in a young child occurs alone in so many conditions that it is of little diagnostic value; fever with respiration over 40 to the minute, and with a diminished ratio between it and the pulse rate occurs in other conditions than bronchopneumonia, but is rarely long continued except in the latter. It is seen in digestive disturbances with intestinal distention, at the onset of acute infectious diseases, especially when these are accompanied by involvement of the air passages; thus in measles, during the height of the fever, disturbance of the respiration pulse ratio is the rule. Scarlet fever, on the other hand, rarely gives it; acute bronchitis, meningitis, nasal obstruction due to acute nasopharyngeal infection, laryngeal stenosis, and, finally, it is probable certain reflexes, as those due to dentition, middle-ear and mastoid diseases, may be a cause of this common phenomenon.

Bronchopneumonia may be distinguished from bronchitis of the large and medium bronchi by the lower temperature and shorter course of the latter, usually not over four or five days, absence of toxemia, and of the characteristic râles of bronchopneumonia.

From so-called capillary bronchitis it is not possible nor essential to distinguish bronchopneumonia; the cases of the former, in which I have had an opportunity to make a microscopic examination of the lung, invariably showed more or less involvement of the air vesicles. There seems to be no good reason for making a clinical

distinction between a disseminated bronchopneumonia and a capillary bronchitis.

Fluid in the chest in infants and young children, usually occurs as a complication or sequela of pneumonia, either of the bronchial or lobar type. It is more often turbid in character or a thick, creamy pus than clear serum. The cases of bronchopneumonia in which it is found are usually those in which there is involvement of the greater part of one lower lobe. There may be a bulging of the chest wall on the affected side and more or less displacement of the heart to the opposite side, percussion will give dulness or flatness over one of the bases, extending well up in the axillary line; on auscultation there is diminished or absence of breathing on the affected side and with an underlying bronchopneumonia or compressed long distal bronchial breathing. Pleuritic râles are frequently heard. Finally, in cases of doubt, exploratory puncture should be made with a needle of large caliber.

Bronchopneumonia is sometimes mistaken for laryngeal stenosis by those unfamiliar with the symptoms of the latter, and I am informed by an antitoxin inspector of the Board of Health that in his experience, cases of the former are occasionally intubated by mistake. The comparatively slow, painful and perfectly characteristic respiration of laryngeal stenosis, marked epigastric and sternal recession, the expression of intense anxiety or even terror on the face of the child, all constitute a picture which is so typical that it would seem that only lack of experience could justify its being mistaken for any other condition.

When bronchopneumonia occurs in the course of a laryngeal diphtheria, its recognition by physical examination is sometimes rendered difficult by the transmission of the abnormal respiratory sounds from larynx and trachea, so that the diagnosis must be made largely on the symptoms (rise in fever, respiration and pulse). When pneumonia is present in such cases, the question sometimes arises if the appearance of a marked cyanosis, dyspnea and air hunger is due more to the complicating pneumonia or laryngeal condition; in desperate cases, when the question cannot be definitely settled, it is perfectly justifiable to exclude the laryngeal element by the performance of intubation.

Meningitis of any variety should not be mistaken for pneumonia; on the other hand, bronchopneumonia, with exaggerated nervous phenomena, may at its onset lead to an erroneous diagnosis of meningitis. Both diseases may be ushered in by convulsions, which may recur repeatedly during the course of the disease. In both there may be spasm of groups of muscles together with ocular symptoms; in both Kernig's sign and tâche cérébrale may be found; rigidity of the neck is not uncommon in pneumonia, while the apathetic facial expression of the latter bears somewhat of a resemblance to the mask-like face of meningitis. Finally Cheyne-Stokes respiration may occur in both. The respiration of meningitis is slow, characteristic of the disease and usually quite unlike that of pneumonia. The pulse is slow or not markedly quickened and is irregular; the rigidity of the neck is much more marked; opisthotonos is frequently present; muscular spasms are much more lasting; ocular symptoms occur with great regularity together with paralyses, coma and delirium. Finally, in cases which cannot be otherwise differentiated, lumbar puncture will generally accomplish the result.

Malaria, especially when, as is frequently the case, it is accompanied by bronchitis, may be mistaken for bronchopneumonia; enlargement of the spleen does not serve to render a positive differential diagnosis and blood examination must be relied on in doubtful cases.

I have only to add that in obscure, acute, febrile cases occurring in young children, the possibility of bronchopneumonia must never be overlooked, and the practitioner who has the various phases of this protean disease constantly before his mind can alone hope to avoid pitfalls laid for the unwary; even though, in accomplishing this end he becomes a species of devil's advocate, coming to regard every suspicious case as guilty until proven innocent.

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THE PATHOLOGY OF LOBAR AND BRONCHOPNEUMONIA IN INFANTS AND CHILDREN.*

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WHILE there may be room for differences of opinion as to the relative frequency of lobar and bronchopneumonia among infants and children in clinical experience, there is no doubt as to the prevalence of the latter affection in the autopsy room. In the last 500 autopsies at the Foundling Hospital we find bronchopneumonia recorded 191 times, approximately 40 per cent of the examinations, while lobar pneumonia was found in but 25 cases, 2 per cent. of the examinations. These figures throw no light on the question of the relative frequency of the two affections during life. In the early years of life lobar pneumonia is regularly a primary disease, is rarely fatal and is therefore infrequent in the autopsy room. Bronchopneumonia, on the other hand, is rarely primary, but is the dreaded complication of the infectious diseases so common among children, especially measles, diphtheria, whooping cough and the gastro-intestinal affections. Attacking patients already weakened it is correspondingly more fatal and more frequently seen in the post-mortem examinations.

The pathology of lobar pneumonia in infants and children presents no striking differences from the appearances familiar in later life. So far as my personal experience is concerned I cannot recall ever having seen in the infant or child the primary state of lobar pneumonia, that is the stage

* Read before the Pediatric Section of the Academy of Medicine, New York, Dec. 10, 1903.

of simple congestion. We regularly find it as a red or gray hepatization of one or more lobes of one or both lungs. Of the 25 fatal cases already mentioned 12 involved the right lung, 6 the left, and in 7 instances both lungs were affected. In the stage of hepatization the affected lobe or lobes is enlarged, firm, the pleural surface injected and hazy or rough from a coating of fibrin, and on section the lung is airless, granular, deep red or grayish red. While there may be shadings in the color of the exposed surface, one part being redder than another, the section is usually quite uniform, a characteristic which taken in connection with the granular appearance is fairly distinctive of the lobar type of inflammation.

While, as a rule, a whole lobe or several lobes are involved in the process, it is more common in children than adults to see a partial consolidation of a lobe, or a distinctly lobular type of pneumonia. Apart from the question of the area involved the appearances are the same.

The amount of pleurisy seen in these cases varies greatly. Most frequently there is only enough fibrinous exudation to render the pleura hazy or slightly granular, but it is not uncommon to see a heavy deposit, pale greenish-white or yellow in color, plastered like a mortar over the pleura to the depth of one-third to one-half inch. There are all grades between these two extremes. With the pleurisy there will be more or less serum, sero-pus, or pus in the pleural space. In some cases of lobar pneumonia the infiltration of the lung is so intense and the degeneration of the cells so advanced as to give a very granular appearance and a pale yellowish color to the cut surface very suggestive of the caseous pneumonia more often seen in adults. One instance of this kind I recall in which two very competent pathologists regarded the process as surely tuberculous, but smears from the surface showed an abundance of pneumococci and no tubercle bacilli.

As a very great rarity true caseous pneumonia may occur in infancy. The one example of this process which I have seen closely resembled the ordinary lobar pneumonia, but the affected lung was more dense, the cut surface was more granular and more uniformly yellowish-white than in the common consolidation. Smears from the surface showed numbers of tubercle bacilli. From time to time small abscesses may be seen in the consolidation of lobar pneumonia, and more or less extensive gangrene of the lung may occur.

The microscopical picture in lobar pneumonia is fairly familiar. The pleural surface shows the fibrinous exudate, the air spaces and the smaller bronchi are filled with an exudate of red blood cells, leucocytes, epithelium, and fibrin, together with bacteria. In the early stages the congestion is marked and there will be abundance of blood in the exudation. Later the blood disappears and the other elements of the exudate increase. There is usually less epithelial desquamation but more fibrin, and the fibrin is more uniformly distributed through the section. The general connective tissue of the lung is swollen and may show some infiltration with new cells. If abscesses are formed or gangrene develops, the corresponding appearances will be seen in the section.

Apart from the pleurisy regularly met with in lobar pneumonia the most important associated lesions are the inflammations of the other serous membrane, the pericardium, the meninges, and the peritoneum. In these tissues we may see a serofibrinous inflammation, and especially in the pericardium or the meninges the deposit of fibrin may be very heavy. Such complicating processes are regularly due to the activities of the pneumococcus and are the evidence of a general infection with that organism.

With the appearance of bronchopneumonia in infancy and childhood we are much more familiar. As already stated the complicating pneumonia of the infectious diseases is regularly of the bronchial type, and bronchopneumonia is met with in about 40 per cent. of all the autopsies at the Foundling Hospital.

In general three distinct types of bronchopneumonia are recognized, types which represent stages in the development of the process, just as the congestion, red hepatization and gray hepatization represent the stages in the evolution of lobar pneumonia. In all three stages the process is regularly bilateral, and for the most part symmetrical. The posterior parts of the lungs usually show more extensive consolidation than the anterior, although it is not at all infrequent to find the anterior extremities of the upper lobes firmly consolidated. In the first of these stages or types, the beginning bronchopneumonia or the capillary bronchitis of former years, the surface of the lung may appear normal or there may be a few small areas of collapse, the affected portions being deep blue, depressed, and airless. On section the greater portion of the lung appears normal, but about the smaller bronchi there are throughout both lungs rings of deep red congestion, and on opening the bronchi the appearances of a bronchitis are found. In such cases it may be quite impossible to appreciate by sight or touch the presence of any consolidation, but on microscopical examination we find the smaller bronchi full of an exudation, consisting of epithelium from its walls and leucocytes, together with bacteria. The wall of the bronchus appears swollen, is infiltrated with leucocytes, which may be observed between the cells still affixed to the wall, in the submucosa and beneath it. The air-cells immediately about the bronchus will be found filled with cells exfoliated from their walls, with leucocytes and a very little fibrin. In some cases we see many red blood cells, but this is quite unusual. At the periphery of the zone of inflammation will be seen a ring of air-cells in which the exudation is very largely fibrin. In some instances the contents of the bronchi consist only of a fine glandular material and fragments of nuclei, and exudate having undergone necrosis.

The second stage or type shows areas of consolidation disseminated throughout the lung. The areas are of varying size, large enough to be ap-

preciated by the sense of touch as consolidations, and yet with lung tissue between them which is normal or congested or emphysematous. On section the surface is deep red, rather smooth and shiny, lacking the granular appearance so characteristic of the lobar consolidation. The smaller bronchi in these cases usually project slightly from the cut surface and, upon pressure, show plugs of muco-pus. The microscopical picture is essentially that already described, but involving more extensive areas.

The third stage is that known as pseudolobar bronchopneumonia, in which the previously disseminated areas of consolidation merge one into the other and a whole lobe becomes solid. The affected portions are airless, the cut surface may be slightly dull, but has not the granular look seen in the lobar pneumonia, and is almost always mottled or dappled dark red and gray, the lighter colored areas being the earlier and more intense peribronchial consolidation. Owing to the branching of the bronchi these lighter areas usually show something of a stellate arrangement, the figures formed suggesting the trefoil of the clover leaf. It is not at all uncommon to find in these extensive bronchopneumonias a breaking down of the smaller bronchi with the formation of small abscesses, and gangrene may occur, particularly in the bronchopneumonias associated with such processes as cancrum oris and diphtheria.

When a bronchopneumonia involves a whole lobe, we usually find that the posterior parts are much deeper in color than the anterior, owing to the attendant congestion; in fact, in the extensive consolidations seen in fatal cases of diphtheria and similar affections, we are often struck by the dirty-white color of the anterior portions of the upper lobes, although they are consolidated. Even in these paler areas the contrast between the peribronchial infiltration and the more peripheral consolidation can be appreciated. In most of the extensive bronchopneumonias there is considerable emphysema of the interstitial tissue in the anterior parts of the lungs.

With a bronchopneumonia involving the greater part of a lobe there is usually some pleurisy. As in the case of a lobar pneumonia there may be only a slight deposit of fibrin on the pleural surface or the exudate may be quite heavy. The very thick exudates are, however, more common in the lobar pneumonias. The writer has been impressed by the frequency with which empyema is associated with empyema. In a study of the pathology of empyema in infants the writer found that among 101 cases there was more or less consolidation of the lung in 56. Of these 56 cases 10 showed lobar pneumonia, 27 bronchopneumonia, 15 were indefinite, and 4 showed tuberculosis. This frequency of bronchopneumonia in association with empyema is, I believe, rather in contrast with the findings in the later years of life.

The microscopical picture in these extensive bronchopneumonias is only a more extensive development of the condition found in the early stages. The essential features are the infiltration of the walls of the smaller bronchi and the air-cells immediately about them, the abundant desquamation from the walls of the alveoli, the usually scanty appearance of red cells in the air-spaces and the smaller amount of fibrin in the exudate. With the development of abscesses or gangrene the corresponding appearances will be found in the section.

The bacteriology of lobar pneumonia is now well established. While other organisms may, under favorable conditions, cause such a pneumonia, in the great majority of cases (95 per cent Aufrecht) the *Micrococcus lanceolatus* or the pneumococcus is the causative agent. The pneumococcus may be found alone or associated with other organisms, the Friedländer bacillus, streptococci, staphylococci, and various others. The relation of the pneumococcus to lobar pneumonia has been strengthened by the demonstration of its presence in the blood in these cases. The workers of recent years have reported steadily increasing percentages of such blood infections. The Klemperer brothers never found the pneumococcus in the blood. Aufrecht says that they are found in the blood in from 10 per cent to 50 per cent of the cases. Silvestrini and Sertoli found them in 15 out of 16 cases. Prochaska, in 1901, reported 50 examinations with positive results in all. Rosenow, who gives a careful review of the whole subject, reports this year 77 positive results in 83 cases. All of which serves to more firmly establish the relation of the pneumococcus to the lobar pneumonia and to support the view that the affection is to be regarded as a general infection with a local lesion.

The bacteriology of bronchopneumonia is more complicated, but here again the pneumococcus is the prevalent organism, occurring in 50 per cent or more of the cases. In other instances streptococci, staphylococci, the Friedländer bacillus, the diphtheria bacillus (Frosch, Babes, Baginsky), the typhoid bacillus (Polynieri) may be found. The majority of the cases are mixed infections. In the primary cases the pneumococcus is more likely to be found. In the secondary cases the streptococci, staphylococci, the Friedländer bacillus, or the organism of the primary disease (diphtheria, typhoid, etc). Whether or not there is a blood infection in the primary cases of bronchopneumonia has not yet, to my knowledge, been proven. That such will be found to be the case seems highly probable, and we are very likely to arrive at a conception of the disease similar to that entertained for the lobar affection. The tendency of the present time seems to lead to the diminution of the importance attached to the local lesion and to the increased importance of the nature of the infecting organism and of the powers of resistance of the infected individual.

Typhoid in Paris.—In 1882 the deaths from typhoid fever in Paris were 142 per 100,000 inhabitants; to-day the proportion is only 10 per 100,000.

TREATMENT OF BRONCHOPNEUMONIA IN CHILDREN.*

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WHAT are we to treat, a lesion, or a patient with lesions?

Pulmonary inflammation in a child under three years is commonly bronchopneumonia because of anatomical peculiarities, among which may be mentioned much loose connective tissue, abundant lymph spaces, transitional (young, embryonal) cells, and, of course abundant blood vessels and unstable nerve centers. Given young tissue, mixed infection of pus-forming cocci, varying in virulence and rapidity of growth, in a subject exhausted by a previous disease, and we have all the elements to account for the irregularities of onset, course, ending and pathological findings. At autopsy we find masses in one lobe, or scattered masses in all lobes or a whole organ soggy and dripping with seropurulent exudate.

This is what we are to treat then—a case, or a patient with a pulmonary apparatus which is more or less in a condition of a pulmonary erysipelas or pulmonary cellulitis, with associated severe prostration, bacteriemia, septicemia. I believe we will make some progress in our conception of the disease, and in our rational treatment, if we think of bronchopneumonia as a pulmonary cellulitis, or a pulmonary erysipelas.

Bronchopneumonia is characterized by irregularities. It is commonly a secondary disease, incited by mixed infection, all the elements of the lung being, to a variable degree involved. The prognosis of the patient is uncertain because the child is twice a patient, exhausted by a second disease.

That household bogy—"catching cold" is less feared than formerly in connection with vaccination wounds, sprained ankle and erysipelas. This is a favorable time to think of bronchopneumonia as an infectious disease with active febrile movement. At present it is almost needful to withhold the name pneumonia from the parents; in order to do justice to the patient. Happily, at this date, in the progress of time and medicine, we no longer think a typhoid patient has caught cold if he develop bronchitis or that a facial erysipelas patient has suffered from a draught of air, if he adds empyema to his ailments. Mastoiditis does not cause the physician to be accused of needlessly exposing a scarlet patient. The poor doctor is always to be blamed, but he has promise of some relief; sometime the blame will be thrown upon the patient, his run down condition and his germ.

Who can forget Alonzo Clark's courageous act in letting air into the typhus wards? To-day a typhus in a tent would not excite a remark.

Prophylactic Treatment.—I shall mention but one, antitoxin—that is the immunization of diseases liable to diphtheria complications, in institution epidemics. This may apply to the crowding of measles patients especially. No physician can longer afford the opprobrium of the bad results following the omission of this precaution, even if it be possible that he is congenitally deficient, either in medical judgment or conscience. Immunizing measles cases when grouped, prevents the complications of diphtheria and much of the subsequent pneumonia.

I shall not take the time of this audience to drone over the prescriptions for pneumonia in infants. I shall give only my own ideas of treating a patient whose pulmonary tissues are, every element of them, stroma, cells, lymphatis and blood vessels reacting to overcome the deleterious effects of various growing, pus-forming cocci. We are told by the blood students and pathologists of a struggle of body cells and serum against cocci and toxins, of homemade antitoxins, and a shadowy suggestion of a kind curing Nature. I mean to dwell upon hygienic aids, and this not being a cyclopedic paper or audience, I may not be blamed if I omit drugs. The walls of this Academy know very well that drugs have had their innings.

TREATMENT.

How shall we help a patient with bronchopneumonia to get well? How give Nature a fair field for the struggle? In preparing this paper I have drawn upon the experience of several years. The problem is how to sustain the patient in overcoming the toxemia, the manifestations being fever, stupor, restlessness, delirium, disturbed circulation, heart fatigue and persistent cough.

Hygienic Treatment.—1. Fresh air, preferably a large room, southern exposure, sun swept; bed in middle of room, eyes directed away from bright light. Air should be fresh, cool and flowing. Temperature below 65° F. Nurses may need extra wraps. Flowing and fresh mean the same. A child with a lame lung should not breathe five times when three times will do. With limited capacity the lung demands oxygen in the natural proportions to be found in the atmosphere. The above conditions apply to a child in sthenic febrile reaction.

How about "catching cold?" In my opinion such a patient is no more liable to catch cold than a case of erysipelas of the face or leg, no more than a scarlet fever patient in its early sthenic reaction to poison. The freshly liberated poison in a patient capable of bounding reaction, summons into response all of Nature's resources of protection, and acts as a sharp stimulant.

You may recall the story of the burning of a pneumonia hospital in the mountains of Western Virginia, in war times. A sharp snowstorm and exposure of overtired soldiers, brought down a large number of pneumonias. Overtaxed heating apparatus burned up the hospital. There was a wail reiterated through the papers of the land, that all these unfortunate soldiers must die because they were lying in the snow, with only a canvas stretched over barrels to protect them. They all got well.

* Read before the Pediatric Section, New York Academy of Medicine, January 14, 1904.

No one catches cold from fresh air entering the nostrils or from fresh, cool, flowing air striking the oval of the face. An overworked débutante, emerging from a hot theater, with her face puffed and dusky from a blood full of second-hand breaths, may catch cold because her defenses are down and she easily succumbs, but I have never any fear of a fever patient catching cold in bed.

2. Water, plenty of it in small quantities, cool and fresh. It both refreshes and facilitates natural elimination. I intend to reiterate the word "refresh" in the treatment of pneumonia. Refresh the patient with cool, fresh air. Refresh with water, and plenty of both.

3. Quiet and rest. The one thing in treatment easily forgotten is tranquillity and restfulness. Pneumonia patients are nervously susceptible to noise and confusion and worn out by it. A tearful grandmother should be removed. A single trained nurse of congenial temperament should be in sole charge. The sickroom should not be the gathering room of the clan; Sunday afternoons should not find the door of the patient's room ajar to every pusher and to every push. But yesterday I was obliged to clear a room of two old women, four big sons and a pug dog, leaving two doctors, a patient and a nurse.

4. Free evacuation of the bowels at the very outset. This should be effected by castor oil in full doses, with or without previous calomel. Never give anything but full doses of castor oil, full for the age. Good cleansing of the intestinal tract is the first aid to the injured. Something seems to happen to the intestinal contents at the first moment of the febrile onset. It thenceforth appears to contain an absorbable poison, the removal of which often allows the fever to fall abruptly. If the fever rises subsequently, in spite of elimination, the diagnosis and course of treatment are clear.

5. Correct indigestion; regulate the food to avoid fermentations and gas. This is often the most troublesome feature of a case. Avoid cough syrups and fermentable foods. The pressure upon heart and lungs by a gas-filled stomach and colon does not leave a fair field to nature. To correct this condition, when present, high rectal irrigations of a hot salt solution act favorably.

6. Antipyretics. Make use of sponging or cold applications of water administered in any way to reduce temperature without disturbing or worrying the child. But remember it is possible to do harm in this way, often more harm than good. Just here let me say, that if every clinical thermometer should fall to the tile floors with a crash, to-night, though all other cases might suffer, not a pneumonia case would. That ever-present, blessed thermometer, like a stepmother, may be bad, or a misfit. Our students are drilled to begin something the moment the thermometer points to 102.5° F. They generally begin to move at 102.5° F. before they can remember which disease it is requires antipyretics.

To judge of a pneumonic child stand at the foot of the bed ten minutes, watch and think. Take your stethoscope and leave the thermometer and prescription book in the bureau drawer at home. One other point; try by example and precept, line upon line, to drill it into the minds of nurses to take some observations besides those recorded on the thermometer. It is a fault in our nurses' training that they never take the respiration of an infant or child. They always take the temperature, sometimes the pulse, but never the respiration. The consequence is that the physician usually has to do that himself. It is the toxemic symptoms, fever, stupor, restlessness and delirium, which suggests the line of treatment. What the thermometer reads is of very little consequence. Different patients bear temperature variously.

An ice cap to the head: Well, to put it into words, we usually apply ice caps to the hair. A polar bear takes his nap after lunch most comfortably on an iceberg. He simply curls up in his hair, on his ice cap, and dreams of honey and grapes. Hair is so poor a conductor of heat, the scalp must often wish it were bald. A cloth wrung out in cold or cool water and applied to the forehead and temples, with frequent sponging of the face, wetting of the lips and sponging of hands and wrists, accomplishes much. It refreshes and cools.

7. Heart stimulation is not always needed. I have come to think that when a heart is acting badly in pneumonia, it is time to see how much gas is in the abdomen, how clammy and cold the feet are, how hot the head. I tell a nurse to quit recording temperature, to take the respiration and the pulse, but every time she takes temperature, to take the toes; in other words, to see if the feet are cold. A child with cold feet cannot digest. Gas forms, the heart cannot find room to beat regularly. It makes me *think* something to find a nurse reporting an intermittent pulse and giving heart stimulants, and on arrival I find the patient's feet and hands are cold and clammy. Hot foot-baths cure that kind of heart trouble. Give the foot-baths with or without mustard. It's the *heat* we want, heat sufficient to puff the feet, red and hot and swollen with blood which had made up its mind to go elsewhere. Give the foot-bath under the bed clothes. I never saw a Junnaud's boot, but as I understand it, it was one grand cupping glass to draw the blood into one leg. I approve of that part of it. To stimulate the heart, relieve its embarrassment by hot, high salines and hot foot-baths.

8. Promote general comfort. This most important aid calls for tranquillity of surroundings, sponging the face, wetting the lips, not too frequent dosing and feeding and allowing long sleeps, and the employment of congenial, tactful nurses.

Things to Avoid.—Avoid all constriction of the chest; swathing poultices. Poultice for pain only.

Avoid maceration of the child's skin. Change to warmed dry garments often enough to avoid it. Keep patient comfortable.

Avoid disturbing the child's needed rest. When the critical sleep comes to a previously restless child, recognize it and do not disturb it.

Avoid steam and canopies. They are good in catarrhal laryngitis with spasmodic cough, but not for bronchopneumonia for they rob the patient of oxygen. The indications for foot-baths are: Restlessness, drowsiness, dusky, flushed face, and persistent, nagging cough. The results are quiet sleep, averaging two to four hours; prompt relief of cough, flush leaving the face in fifteen minutes, followed by sleep immediately thereafter. In fact, it is a result which is satisfactory and encouraging to physicians, nurses and parents. If all who witness the effect of treatment day by day, approve it, especially the parents of an only child, there is something good in it.

My contention is for fresh air, cool and flowing, for the full proportion of oxygen natural in the atmosphere. No secondhand breaths for lame lungs. Call the case pulmonary fever or pulmonary cellulitis, and treat it rationally. I have seen such favorable changes from removing a child from an inner sunless room to a room with two open windows, changes in color and in mental condition that I am sure I cannot be mistaken about the good result. I have seen the same good results in robust adults and in infants, and all ages and conditions between. Have I seen any bad result? No. I never saw anything but good in giving air and water to a fever patient. My impression is one cannot give too much. Our city houses are full of exhalations of human beings, permeated by furnace gas and escaping illuminating gas, full of dust, and overheated. A person overtired and worn out from loss of sleep is caught by cold.

To summarize how to cure a baby with bronchopneumonia.—1. Castor oil to clear the field of operation. It is the first aid to the injured.

2. Fresh air, cool and flowing. It reddens the blood, stimulates the heart, improves digestion, quiets restlessness, aids against toxemia. Regulate the temperature of air of the room inversely to that of the child. The patient's feet must always be warm, and the head cool.

3. Water, plenty, inside and outside. Temperature of the water as indicated by child's temperature.

4. Quiet and rest. Tranquilizing influences about patient. Undisturbed sleep.

5. Correct feedings to avoid fermentation and gas in abdomen. If there is need, high hot salines.

6. Antipyretics. Water. No coal-tar products.

7. Heart stimulants. Fresh air, hot foot-baths. Relieving tympanites and crowding. Hot foot-baths and hot salines can be given in a cold room. Both can be given under the bedclothes.

Drugs.—Whisky and strychnine. These are the first drugs mentioned in this paper, unless that household remedy, castor oil, be included. Promote general comfort in every rational way.

How to Kill a Baby with Pneumonia.—Crib in far corner of room with canopy over it. Steam kettle; gas stove (leaky tubing). Room at 80° F. Many gas jets burning. Friends in the room, also the pug dog. Chest tightly enveloped in waistcoat poultice. If child's temperature is 105° F. make a poultice thick, hot and tight. Blanket the windows, shut the doors. If these do not do it, give coal-tar antipyretics and wait.

THE BEHAVIOR OF THE COSTAL ARCH IN DISEASES OF THE ABDOMINAL ORGANS AND ITS IMPORTANCE AS A DIAGNOSTIC SYMPTOM.

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(Continued from Page 774.)

Case IX. Cholelithiasis in the Quiescent Stage.—M. K., aged forty-six years; admitted to the hospital December 11, 1901. Patient has always enjoyed excellent health until five months ago, when she suffered from an attack of dysentery lasting five to six weeks. Three months ago patient was seized with a severe attack of vomiting and of abdominal pain over the region of the gall-bladder, lasting for several days. There was slight jaundice and costive, slightly clay-colored stools. Since then the attacks have recurred every few days, their onset being favored by the ingestion of any form of solid food. During each attack she is prostrated and unable to attend to her household duties. The constipation is constant.

Examination on Admission.—Patient is very corpulent, with a large, pendulous abdomen. There is slight icterus. There is tenderness over the region of the gall-bladder. There is rigidity of the corresponding portion of the costal arch of moderate degree but no rigidity of the adjacent segment of the rectus muscle.

Operation (Gas and Ether).—An oblique incision, parallel to the lower border of the costal arch, was made, with its center over the region of the gall-bladder. This organ was found completely embedded in adhesions and of small size. It had been drawn nearly to the median line by the contraction of the tissue in which it was embedded, and was adherent to both the stomach and the under surface of the liver. The gastro-hepatic omentum was very considerably shortened, the lesser curvature of the stomach lying close to the under surface of the liver, and the foramen of Winslow obliterated. The gall-bladder was very atrophic, and its wall a thickened mass of connective tissue. It was opened and several small calculi and considerable calculus detritus was removed. Owing to the density of the adhesions, it could not be separated from the adjacent liver without undue risk of hemorrhage. A tampon of gauze was then inserted down to the orfice and into the cavity of the atrophic bladder, it being impossible to approximate it to the parietal peritoneum. Closure of the incision in layers on either side of the drain.

Postoperative.—The patient suffered intense pain for forty-eight hours, at the end of which time the biliary fistula became established. The vomiting was also persistent for three days, until the bowels moved. There was no distention. After the third day rapid improvement, the further convalescence being uneventful and the fistula completely closing in six weeks. December, 1902. Except for slight rheumatic pains, patient has had excellent health since the operation.

Case X. "Perihepatitis."—E. B., aged fifty-five years; admitted to the Presbyterian Hospital December 6, 1902. Patient has always been well. No history of venereal difficulty. No alcoholic habit. Three days before admission to the hospital, after exposure to cold, patient suffered from a chill, with pain in the lower right side of the chest, both in front and behind, the right hypochondrium being sensitive to pressure. There was fever, cough, which was dry, prostration, and the patient was confined to bed. The pain persisted and was cutting in character; it was intensified by deep inspiration. The bowels were constipated and the urine was high-colored.

Examination on Admission.—The conjunctivæ are icteric. The entire abdomen is rigid, the rigidity being most marked in the right upper quadrant over the region of the gall-bladder. There is a very distinct resistance of the upper half of the right costal arch. The temperature varied between 101° and 104° F., the pulse from 88 to 104. The leucocytosis in several examinations varied between 16,000 and 20,000.

Operation (Chloroform).—A vertical incision was made parallel to the outer margin of the right rectus. The lower part of the peritoneal cavity was free from adhesions, but there was a distinct increased intra-abdominal tension characterized by the tendency of the intestines to prolapse through the abdominal incision. The gall-bladder and ducts were normal. Exploration of the liver with a hypodermic needle gave a negative result. The entire upper surface of the right lobe of the liver was joined to the diaphragmatic and parietal peritoneum by numerous adhesions of varying density which were separated from their point of attachment on the liver only with considerable difficulty. In other respects, the liver appeared normal. The adhesions were broken up, and the abdominal wound closed in layers, a cigarette drain being left in the lower angle.

Postoperative.—On the morning after the operation the patient declared that he was free from pain and that he felt very much better. The improvement steadily continued, and at the end of a week both the pulse and temperature had returned to normal. The would healed *per primam*, and at the end of four weeks the patient returned to work feeling perfectly well. December, 1903. Patient has enjoyed excellent uninterrupted health since the operation.

Case XI. Sarcoma of the liver.—K. H., aged forty-nine years; admitted to the Presbyterian Hospital March 2, 1903. Previous history negative. About eighteen months ago patient suffered from occasional sharp pains in the right iliac and lumbar regions. These occurred in attacks about once a month and were accompanied with vomiting. A physician, called in attendance at that time, diagnosed "abdominal tumor." These symptoms continued until five weeks ago, when the pain became more severe and was brought on by the slightest exertion. For the greater part of that time the patient has remained in bed. The bowels have been habitually constipated. There has been no jaundice. There has been considerable loss of flesh and strength.

Examination on Admission.—There is asymmetrical bulging of the abdominal wall, the right side being protruded by some underlying growth which extends a distance of three inches to the left of the median line. Above, it disappears beneath the costal arch, and below, in the median line, it extends to within two inches of the symphysis. There is asymmetrical respiratory movement of the costal arches, the right remaining almost motionless during expiration. On palpation, the bulging is found to be due to the presence of an abdominal growth moderately elastic, yet of firm consistency, with a smooth surface. Above, it is lost beneath the right costal arch, which cannot be depressed toward the vertebral column, and below, by rectal examination, the mass can be felt to occupy the upper part of the pelvis. Percussion over the tumor yields a flat note, continuous above with the liver flatness. The mass can be removed slightly from side to side without much discomfort to the patient.

Operation (Gas and Ether).—Incision parallel to the outer border of the right rectus, extending upward above the level of the umbilicus. On opening the peritoneal cavity, the mass was found to be adherent to, and to infiltrate extensively, the anterior abdominal wall. The abdominal wound was closed after a portion of the tumor had been removed for subsequent microscopical examination.

Postoperative.—The patient recovered from the effects of the operation, but her general condition gradually became weaker ,and death occurred in about two weeks. Microscopical examination of the tumor, which was evidently primary in the liver, showed it to be a spindle-cell sarcoma.

Case XII.—L.L., male, aged thirty-five years; admitted to the Presbyterian Hospital April 14, 1902. Moderate alcoholic habit. There is no history of colitis. About nine months ago patient suffered from an attack of catarrhal appendicitis, from which he recovered without operation. With this exception he has always been well and able to work. Ten days ago he was suddenly seized with severe pain in the epigastrium, equally pronounced on both sides. It was accompanied by chill, followed by fever and sweating. There was no vomiting. These symptoms have continued except for short intervals, the pain being so severe as to interfere with sleep.

During the past week the pain has become localized in the right hypochondrium and epigastric regions, and tenderness has developed. The bowels have been constipated, no movement have taken place for the last three days. The stools have been of normal color. There has been no jaundice. During this time the prostration has been sufficient to confine the patient to bed.

Examination on Admission.—There is diminished respiratory movement of the upper part of the abdomen and of the costal arch. On palpation, in the middle line, extending from the ensiform appendix to within one inch of the umbilicus, is a mass of which the surface is smooth, the consistency elastic. It is tender under pressure, and extends farther to the right than to the left of the median line. The pain is increased by deep respiration and also by efforts to turn the body from right to left. The mass moves up and down with the respiratory movement of the liver. There is rigidity of the upper portions of both costal arches, more marked, however, on the right than the left side. There is some rigidity of the adjacent portions of the recti muscles. The temperature is 102° F., varying between 101° and 103° F. The pulse remains under 100. There is 15,000 leucocytosis.

Operation (Gas and Ether).—Incision in the median line above the umbilicus. The wall of the abscess cavity was found adherent to the parietal peritoneum, and the cavity was opened, evacuating about one pint of pus, without entering the general peritoneal cavity. The size of the abscess cavity was about that of an orange, and the pus was thick and of a red color. Partial suture, with a rubber drain enveloped in gauze.

Postoperative.—There was immediate relief from the pain, with prompt return of both pulse and temperature to normal. The abscess cavity gradually closed by granulation without the leakage of bile. For weeks after the operation, a sinus, about one and one-half inches deep, remained, subsequently closing. December 1, 1902. Patient had enjoyed excellent health since leaving the hospital. A slight rupture has developed in the lower part of the cicatrix.

Case XIII.—R. D., male, aged twelve years; admitted to the Presbyterian Hospital November 2, 1902. With the exception of chronic ear difficulty following one of the exanthemata, patient has always enjoyed excellent health. On October 17 last, patient was operated on at the Manhattan Eye and Ear Hospital of this city for mastoiditis with thrombosis of the lateral sinus. The mastoid cells were thoroughly opened and the internal jugular vein ligated about the center of the neck. The patient made an excellent recovery from the effects of the operation, both pulse and temperature becoming normal at the end of the tenth day, and both the wounds presenting a healthy granulating appearance. Two days ago, without known cause, patient developed very sharp pain in the right hypochondrium. This pain was manifested in attacks of several minutes' duration, at intervals of from half an hour to one hour, and was accompanied by a rise in temperature to 102°, and of the pulse to 130. There was no chill. During the next twenty-four hours the pulse rose to 180, the temperature to 104°, and the patient was transferred to the Presbyterian Hospital for possible operation.

Examination on Admission.—On inspection, there is a marked bulging of the right hypochondrium, extending as low as the level of the umbilicus. The corresponding portion of the costal arch is displaced forward and shows diminished respiratory movement. On palpation, the mass is smooth, elastic, and very tender, moving up and down with respiration. There is very pronounced rigidity of the overlying costal arch and of the adjacent muscle. There is slight rigidity of the left costal arch. Patient lies on the right side with the thighs flexed, any change from this position intensifying the pain. There is 23,000 leucocytosis.

Operation (Chloroform).—A vertical incision was made along the outer border of the right rectus, extending from the costal arch downward. On opening the peritoneal cavity, a small amount of serous fluid escaped, and the enlarged right lobe of the liver bulged prominently into the wound. A needle inserted into the most prominent part of the right lobe withdrew turbid opaque fluid of a gray color and entirely free from odor, at a depth of about two inches. The track of the needle was enlarged with the cautery and several ounces of this fluid evacuated. The cavity was drained with both gauze and tube.

There was considerable restlessness for twenty-four hours. Both pulse and temperature fell slowly for six days to 101° and 100° F. respectively. There was then, without known cause, a shoot of temperature to 104° F., and of the pulse to 120, without wound-disturbance discoverable. Both gradually subsided, reaching normal at about the end of a month. There was no vomiting at any time, the patient taking considerable quantities of fluid nourishment.

The discharge from the wound was yellow and abundant for the first ten days, gradually diminishing as the cavity closed. At the end of a month a superficial sinus only remained. At this time no enlargement of the right lobe could be detected by bimanual examination. Seven weeks after the operation patient left the hospital entirely healed, and remained in excellent health until the following April 21, when he was readmitted suffering from bronchitis and a pleurisy over the lower part of the right lung. Both of these conditions disappeared in the course of ten days, and since that time there has been no further trouble.

Through a misunderstanding, the fluid removed was not subjected to a rigid examination. Cursory examination showed it to contain a considerable number of leucocytes, and to be relatively free from any of the bile constituents.

Case XIV.—A. M., male, aged thirty-one years; admitted to the Gouverneur Hospital May 29, 1902. Previous history negative. Several days before admission patient developed the symp-

toms of fever, which did not subside, and he was brought to the hospital. On admission he was found to be probably suffering from typhoid fever, the diagnosis being subsequently rendered certain by the presence of the "Widal" reaction. For the first three weeks the course of the fever presented nothing materially different from the typical case. During the fourth week there was an increase in the temperature and in the rapidity of the pulse; at the same time the patient complained of pain in the right hypochondrium over the region of the liver. Examination showed rigidity of the upper part of the costal arch with tenderness on pressure. No enlargement of the liver could be detected. There was a leucocytosis of 15,000. Exploration was advised, but refused until July 2. During this time the pain and tenderness increased and the curve of the temperature was that ordinarily seen in collections of pus. The rigidity of the arch had also extended to its lower portion.

Operation (Gas and Ether).—Through a vertical incision parallel to the outer border of the right rectus above the umbilicus the peritoneal cavity was opened and the upper surface of the liver exposed. At a depth of two inches in the right lobe an abscess cavity was detected and pus withdrawn with a hypodermic needle. The pus was evacuated, the liver tissue being divided with a cautery, along the needle as a guide. Drainage with tube and gauze.

Postoperative.—The patient reacted well from the operation and was considerably relieved, there being marked improvement in both the local and constitutional symptoms. The upper portion of the arch resumed its normal resiliency, but the lower portion still remained rigid. Before the expiration of a week the temperature and pulse became higher, and pain and tenderness developed over the region of the liver behind, the resistance of that portion of the arch becoming more marked. There was also an increase in the pre-existing leucocytosis.

Operation July 16 (Gas and Ether).—An oblique incision was made parallel to the twelfth rib posteriorily, the rib excised subperiosteally, and the lowest angle of the pleural cavity opened. There were no adhesions. The opposite diaphragmatic pleura bulged into the wound and, after the withdrawal of pus with a needle, the diagram was incised, opening a large subdiaphragmatic abscess extending into the posterior portion of the right lobe of the liver. This was drained with gauze and diaphragmatic surfaces. The patient reacted well from the operation and drainage was very satisfactory. There was marked subsidence of the local pain and tenderness. The temperature, though somewhat lower, still ran a pyemic course, and the patient gradually became weaker, dying from exhaustion five weeks later.

Case XV.—E. F., male, aged forty-eight years; admitted to the Presbyterian Hospital February 25, 1901. Patient is an Italian, and a satisfactory past history is difficult to obtain. Five weeks ago he was treated in one of the city hospitals with the history of pain in the back and the right hypochondrium for an indefinite length of time. There were no constitutional symptoms of fever. On exploratory operation, the liver was found to extend two inches below the level of the costal margin. Aspiration of the right lobe withdrew no fluid. The abdominal wound healed *per primam,* but the patient developed an irregular temperature and some jaundice, with progressive loss of flesh and strength. The pain in the right hypochondrium still persisted.

Examination on Admission.—The patient is poorly nourished and cachetic. There is slight icterus. There is a well-marked projection of the right hypochondrium, the respiratory movement of the costa larch being diminished. There is dilatation of the surface veins. On palpation there is a smooth mass, deeply seated, projecting inferiorly below the level of the costal margin, a distance of two inches, of which the lower border is indistinct. There is well-marked rigidity of the corresponding portion of the costal arch and of the adjacent rectus muscle, with some tenderness on pressure over the center of the tumefaction. Patient's temperature ranged from 101° to 102° F., the pulse around 100. There was moderate leucocytosis.

Operation (Gas and Ether).—A vertical incision was made along the upper outer border of the right rectus in the line of the cicatrix. On opening the peritoneal cavity there were no adhesions. The right lobe of liver was enlarged and projected several inches below the costal margin. A needle inserted into its prominent portion withdrew pus at the depth of about one and one-half inches. The pus was thick and of a creamy-yellow color. The needle was left *in situ,* iodoform gauze being packed around its point of emergence from the liver, thus shutting off the peritoneal cavity, and at the end of four days the abscess cavity was thoroughly opened along the line of the needle with the Paquelin cautery. The cavity was about the size of a cocoanut, and contained over a quart of pus.

Postoperative.—There was gradual subsidence of both pulse and temperature, reaching normal on the sixteenth day. There was immediate cessation of the pain. For the first few days the discharge from the abscess cavity was very profuse, and contained a considerable amount of bile. It then gradually diminished, and at the end of two weeks was very slight. On the sixteenth day after the operation, pain developed in the left hypochondrium, and the biliary fistula manifested a marked increase in activity. There was a rise in both pulse and temperature. The leucocytosis was again increased to from between 12,000 and 16,000. On examination, there was rigidity of the left costal arch near the junction of the eighth and ninth costal cartilages and of the adjacent rectus muscle, with tenderness on pressure. After four days the patient finally consented to an exploratory incision.

Second Operation (Gas and Ether).—A verti-

cal incision was made along the outer upper border of the left rectus. The peritoneal cavity showed evidence of adhesion. The left lobe of the liver was normal in appearance. A needle inserted, however, withdrew a small amount of pus at a depth of two inches. The opening was immediately enlarged with the cautery and several small abscess cavities enlarged into one with the finger. Rubber tube and gauze drainage.

Postoperative.—The patient made an excellent recovery, both local and constitutional symptoms disappearing promptly. The discharge from the biliary fistula on the right side rapidly decreased, and on leaving the hospital the patient had gained weight and was in very much better condition than at the time of his admission. June, 1902. Patient has gained forty pounds during the past year and has enjoyed excellent health. No culture could be found in the pus.

Case XVI. Subdiaphragmatic Abscess Complicating Acute Appendicitis.—M. H., aged eight years; admitted to the Presbyterian Hospital June 20, 1901. Previous history negative. Five days ago patient was seized with sudden severe pain in the right lower quadrant of the abdomen. At the end of two days, during which time the pain recurred at intervals, patient developed vomiting, diarrhea, and prostration, with excessive abdominal tenderness. The vomiting and diarrhea ceased at the end of twenty-four hours, but the weakness and prostration persisted and became more pronounced.

Examination on Admission.—The entire abdomen is swollen, especially on the right side. There is no expiratory recoil of the right costal arch. Moderate recoil of the left arch. The right half of the abdomen is excessively tender and rigid. The right costal arch is protruded slightly forward and cannot be depressed even for a short distance toward the vertebral column. There is some rigidity of the left abdominal wall, especially in the lower half, but it is less marked than on the right side. The temperature is 104° F., the pulse 140 and weak, the respiration 46. Leucocytosis taken twelve hours after operation amounted to 17,000.

Operation (Gas and Ether).—Incision along the outer border of the right rectus muscle, extending from the region of the appendix to the costal arch above. The opening of the peritoneal cavity was followed by the evacuation of a large amount of pus, which distended a cavity reaching from the brim of the pelvis below to the lower surface of the diaphragm above, extending both in front of and behind the liver. That portion of the pus situated in front of the liver escaped only after the costal arch was elevated by the surgeon's hand. The appendix was gangrenous and was removed by ligation and cauterization of the stump. The abscess cavity was carefully cleansed with peroxide of hydrogen and was drained both above and below with tubes and strips of gauze, a counter-opening being made posteriorly along the lateral margin of the colon, and a gauze tampon being introduced between the upper surface of the liver and the anterior abdominal wall. The middle part of the wound was held together with one suture.

Postoperative.—On the day following the operation temperature rose to 106° F., the pulse varied between 150 and 160, and there was considerable restlessness and delirium. There was no vomiting nor tendency to an increase in the distention, and the patient retained a considerable amount of fluid nourishment. There was moderate peristalsis over the left side of the abdomen. On the second day flatus escaped from the rectum, the bowels moved, and there was progressive diminution of both pulse and temperature, reaching 120 and 103° F. respectively on the third day. From this time on, there was gradual improvement, continuing for two weeks and a half, the temperature ranging between 101° and 102° F., the pulse around 120, and the wound draining very freely both in front and behind. At the end of this time the constitutional symptoms of sepsis increased in severity and there seemed to be slight retention of pus in the upper portion of the wound. Three days afterward expectoration of pus occurred, followed by symptoms of collapse and the death of the patient. No autopsy was allowed, but the extension of the suppurative process along the lymphatics in the diaphragm had evidently not been successfully checked by the operation and had caused the fatal issue.

Case XVII. Acute Pancreatitis.—E. P., male, aged twenty-eight years; admitted to the Presbyterian Hospital June 13, 1901. Previous history negative. Three days before admission the patient experienced some abdominal pain, with one attack of vomiting and general malaise. The bowels were constipated and failed to move since. There was no chill. The prostration steadily increased, and the abdomen has become more tender and moderately distended. He has taken no nourishment. His chief complaints are pain and prostration.

Examination on Admission.—Patient is a well-nourished and muscular man. The entire abdomen is markedly distended. The abdominal pain is general and not referred to any one point. On palpation, there is general abdominal rigidity, most marked in the right upper quadrant. There is increased resistance in the upper part of the right costal arch. There is slight dulness in both flanks, especially the right. On auscultation, peristaltic sounds are heard over the entire abdomen. The urine has a specific gravity of 10.44, is of acid reaction, contains twelve per cent. (by volume) of albumin, and on microscopical examination numerous hyaline and granular casts are found. On admission, temperature was 103° F., the pulse 124 and very weak, and the respiration 28. There was a leucocytosis of 27,000.

Operation (Gas and Ether).—An incision four inches long was made along the outer border of the right rectus above the umbilicus. The peritoneal cavity contained considerable quantities of dark-brown fluid not encapsultated and most

abundant in the right upper quadrant. As it was sponged away, it seemed to be renewed by similar fluid emerging from the foramen of Winslow. The small intestine was moderately distended. The gall-bladder, the gall-ducts, and the appendix were normal. The head of the pancreas was swollen and of peculiar "boggy" consistency. After the careful cleansing of the upper right peritoneal cavity a Mikulicz drain was inserted down to the region of the foramen of Winslow, and the lower part of the wound closed by interrupted suture. Although the operation was quickly performed, the patient's pulse became so feeble as to require an infusion.

Postoperative.—On the day after the operation the pulse rose from 132 to 150 and could scarcely be felt at the wrist. The temperature varied between 103° and 104° F. The patient was restless and perspired profusely. There was no vomiting, and the patient retained considerable quantities of fluid nourishment. Owing to the weak condition of the pulse, hypodermoclysis was given. On the second day after operation the pusle varied between 130 and 140 and was slightly stronger. The temperature varied between 102° and 103° F. The extremities, which had been cold, became warmer. Several hours after the administration of a laxative, there were several dejections consisting of solid and semi-solid brownish material. The patient declares that he feels perfectly comfortable. From this time on there was steady and gradual improvement, the temperature reaching normal on the sixteenth day. Four weeks after the operation the patient left the hospital with a small sinus. The subsequent history of the patient is unknown, repeated endeavors to communicate with him have failed.

Case XVIII. Large Pancreatic Cyst.—A. B. M., male, aged thirty-nine years; admitted to the Presbyterian Hospital October 6, 1902. Patient's sister had an ovarian cyst. Patient was a hard drinker of whisky until several years ago, since which time he has touched no liquor of any kind. Has always used tobacco in moderation.

Seven years ago patient was seized with an attack of sharp pain, knife-like in character, referred to the left hypochondrium and intensified by inspiration. It was accompanied by vomiting and prostration, the former ceasing after several days, the latter being so severe as to confine the patient to bed for five weeks, during which time the attending physician noticed a swelling in the left side, which was so small as not to be appreciated by the patient. These attacks were repeated, recurring at first every month, subsequently at increasing intervals, until two years ago, at which time they ceased entirely. No attack lasted for more than forty-eight hours, nor did any attack confine the patient to bed.

The tumor has steadily increased in size, especially at the time of an attack, and for the past six years has been noticeable to the patient. There has been progressive loss of flesh and strength, the patient weighing thirty pounds less than he weighed seven years ago, and the weakness having become more pronounced during the past two years, and there has been some shortness of breath. At present the swelling has reached so large a size as to be inconvenient, and this, together with the general weakness and shortness of breath, constitute the chief complaints.

Examination on Admission.—The abdominal cavity is the site of an asymmetrical swelling involving the entire left side and extending for a distance of three inches, in its most prominent portion, to the right of the median line. The greatest convexity of the overlying abdominal wall is seen in the left upper quadrant, and the corresponding portion of the costal arch is pushed prominently forward and has no expiratory recoil. There is also extensive bulging of the left flank and ileo-costal space. On palpation, the tumor is smooth, of elastic consistency, and by bimanual examination a fluid wave may readily be detected passing from its upper right to its lower posterior portion in the ileocostal space. There is no fremitus. The portion of the tumor overlying the abdominal aorta left costal arch, and any effort to depress it toward the vertebral column encounters distinct elastic resistance. There is slight descent of the mass during inspiration. On percussion, the entire tumor is flat, being continuous above with the area of cardiac dulness and obscuring the normal area of splenic dulness. The intestinal resonance is situated chiefly in the lower right quadrant of the abdomen. By inflation, the stomach and descending colon are found to lie anterior to the cyst. Repeated examination of the stools give no evidence of the presence of undigested fat, and there is no glycosuria or other abnormal condition of the urine. The general condition of the patient is fair, the heart action of good force and regular.

Operation. October 15 (Gas and Ether.—Vertical incision two and one-half inches from the median line, extending an equal distance above and below the level of the umbilicus, and situated over the most prominent part of the tumor. On opening the peritoneal cavity, the smooth, pearly cyst-wall presented, with the splenic flexure lying on its anterior surface. This was reflected with some difficulty a short distance toward the median in order to bring the contemplated opening through the cyst wall directly opposite the abdominal incision. The entire cyst was retroperitoneal and so firmly adherent to the stomach, the colon, the spleen, and the posterior abdominal wall, as to render any enucleation impossible. The cyst was therefore emptied of its contents, consisting of several gallons of yellow turbid fluid, with a trocar and canula, and its interior explored through an incision in its anterior wall. In this manner the left kidney could be distinctly palpated behind it, and the pancreas, also posterior, could be felt a little higher up and near the median line. A counter-opening was made to the outer side of the kidney in the left ileocostal space, a portion of the cyst-wall being here excised without difficulty. The edge of the anterior opening in the cyst-wall was sutured to the cor-

responding edge of the divided parietal peritoneum, and after the insertion of drainage-tubes both in front and behind, into the cyst cavity, the upper and lower extremities of the abdominal incision were closed by suture.

Postoperative.—There was some vomiting and hiccough for several days, and the bowels moved with rather more difficulty than usually, responding to catharsis on the third day, followed by subsidence of the above symptoms. At no time was the pulse higher than 80, and there was but slight temperature elevation. The discharge from the anterior of the cyst was very slight. During the next ten days the bowels moved regularly, and patient was very comfortable, complaining only of occasional abdominal cramp-like pains. October 27. Patient vomited several times this afternoon. Bowels moved freely with enema. There was no rise in the pulse or temperature. October 28. Patient vomited again to-day. Some cramp-like abdominal pains developed. Bowels again moved after an enema. There was no abdominal tenderness. Pulse and temperature still continued normal. Some local distention developed in the right iliac fossa, evidently due to an inflated cecum. October 29. Distention increased, and the pulse rose to 100, the temperature to 101° F. An exploratory incision was deemed advisable. Under ether, an incision was made over the outer border of the right rectus, below the umbilicus, and the peritoneal cavity was found to contain a considerable amount of fluid fecal material. The perforation could not be found nor could its cause be ascertained. Drainage. Patient rapidly became worse and died the following morning.

Autopsy.—The site of the perforation could not satisfactorily be located. The cyst was found to spring from the tail of the pancreas.

Case XIX.—M. K., aged twenty-four years; admitted to the Presbyterian Hospital August 27, 1900. Eleven years ago patient was thrown from a wagon, but was not incapicated. Between two and three years later, kyphosis developed in the dorsolumbar region, requiring the application of an orthopedic corset.

Nine months ago, without known cause, painful and frequent urination suddenly developed. There were burning sensations over the bladder, intensified by micturition. Patient passed urine every two or three hours during the day and several times during the night. The urine was cloudy and "thick." These vesical symptoms have continued up to the present time, notwithstanding frequent irrigations of the bladder and the advantages of a change in climate. There have been progressive loss of flesh and strength and increasing anemia.

Examination on Admission.—There is a tender rounded mass in the left lumbar region, extending from the level of the crest of the ileum below to beneath the costal arch above and to within 1½ inch of the median line internally. The mass is lobulated, of elastic consistency, and slightly painful on pressure. The lower segment of the costal arch is distinctly rigid, and pressure on it elicits pain. By percussion the descending colon is found to lie anterior to the tumor. The mass descends slightly on respiration. Catheterization of the ureters by Dr. F. Tilden Brown elicited the fact that the urine from the right kidney was normal, while that from the left was scanty and contained large amounts of pus and cheesy material. Examination failed to detect the presence of tubercle bacilli in the urine of either kidney. The trigone was the site of numerous patches of ulceration, which were most abundant around the mouth of the left ureter. The patient's temperature varied between 100° and 104° F., the pulse between 100 and 120. There are physical signs of a healed tuberculous process in the upper part of the left lung.

Operation (Chloroform, followed by Ether).—The left kidney was exposed by a vertical incision along the edge of the erector spinæ, from the lower extremity of which a horizontal incision extended forward toward the umbilicus. The perirenal fat was scanty. The kidney was easily enucleated. It was double the normal size and irregularly lobulated, presenting the appearance of a multilocular pyonephrosis. The pedicle was ligated with heavy catgut. The ureter was traced downward to a point below its crossing of the external iliac vessels and was removed. It presented a beady appearance, and the part which crossed the brim of the pelvis was materially thickened and intimately adherent to the posterior parietal peritoneum and the iliac vessels. Irrigation of the wound followed by closure with chromic gut in layers, a cigarette drain having previously been inserted in the lower angle.

Postoperative.—The patient reacted well from the operation. During the first forty-eight hours there was considerable nausea, but the patient retained a moderate amount of fluids and passed twenty ounces (plus) of urine daily. Movement of bowels took place on the third day. The increased frequency of urination persisted, the urine, however, containing a small number of leucocytes only. The temperature varied between 100° and 103° F., gradually decreasing and reaching normal at the end of the second week. The wound healed down to the drain. At the end of five weeks, patient's general condition was more satisfactory than just prior to the operation. November 20. Since last note the patient has been gaining rapidly in strength. The sinus had closed and reopened. To-day, patient developed what proved to be a pleurisy with effusion on the left side. After three weeks this subsided, leaving the patient very weak. Slow convalescence. December 1, 1903. For the past six months the general condition of the patient has steadily improved. She has completely recovered, with the exception of the persistence of the increasing frequency of micturition at night, which, however, is not painful.

Case XX.—W. S., aged nineteen years; admitted to the Presbyterian Hospital May 18, 1903. General health has always been excellent. About

two months ago, patient was seized with severe sharp lumbar pain. Shortly afterward, the urine became cloudy. The pain at first was not sufficiently severe to interfere with the pursuit of the patient's studies. At the end of a month, patient was compelled to give up work, and consulted a physician. An exploratory lumbar incision was made in the lumbar region over the right kidney by a surgeon in a neighboring city and was completely closed by suture, healing by primary union within three weeks. The symptoms continued, and to the pain were added chilly sensations, and an irregular febrile movement with progressive loss of flesh and strength. Recently a tumor in the right flank has been noticed.

Examination on Admission.—There is a distinct bulging of the right flank, which is found to be occupied by a tumor reaching down into the right iliac fossa, extending upward beneath the right costal arch and as far forward as the edge of the rectus. It is smooth, highly elastic, and by bimanual examination fluctuation can be elicited. It is moderately tender. By percussion, the ascending colon lies anteriorly. There is well-defined rigidity of the lower segment of the right costal arch, and pressure on it causes pain. The temperature varies between 100° and 103° F.; the pulse varies between 90 and 110. There is leucocytosis. The urine is high-colored and contains only a small number of leucocytes, although previously it had contained considerable quantities of pus.

Operation (Gas and Ether).—The cicatrix of the previous operation was excised by an elliptical incision, which was deepened until the perirenal fat came into view. The enlarged kidney, surrounded by a very small quantity of fatty tissue, was readily enucleated, and its pedicle ligated with heavy catgut. The organ was more than double the normal size and was the site of a number of abscesses, one, consisting, of the dilated pelvis, of very large size. The temporary plugging of the ureter, which was in other respects normal with cheesy tubercular material, accounted for the fact that the bladder urine contained a small number of leucocytes only. The wound, after irrigation with salt solution, and the insertion of a cigarette in its lower angle, was closed by chromic-gut suture.

Postoperative.—The patient reacted well from the operation. There was no nausea. There was no diminution in the daily amount of urine. The temperature rapidly decreased, becoming normal at the end of the first week. The wound healed kindly, and at the time of discharge had almost closed. The patient's general condition continued to improve and he left the hospital much stronger than he was at the time of admission. December 1. The sinus has closed and reopened once or twice. His general condition has steadily improved.

Case XXI. Peri-nephritic Abscess.—M. P., aged fifty-nine years; admitted to the hospital October 23, 1902. Previous history negative. Three weeks ago, without known cause, slight tenderness appeared in the left lumbar region, with increasing prostration and loss of appetite. There was an irregular febrile movement. The bowels were regular, and urination was normal and regular. Four days ago the patient noticed a lump in the left flank. The prostration has confined the patient to bed for the past week. The chief complaints are the pain and the prostration.

Examination on Admission.—The left ileo-costal space is the site of a bulging mass, most prominent posteriorly. In front it extends to the margin of the rectus muscle. Behind, the overlying skin is slightly reddened and the tenderness most marked. There is rigidity of the lower segment of the costal arch. The tumor is everywhere dull, except where the descending colon passes anteriorly. The temperature is 101° F., the pulse 100, and there is 30,000 leucocytosis.

Operation (Gas and Ether).—An incision beginning near the border of the erector spinæ muscle and passing obliquely forward and downward in the ileo-costal space, was made over the most prominent part of the tumor. With the division of the transversalis fascia, a large abscess-cavity was opened, the pus being of dark brown color and very foul. By bimanual examination the kidney could be felt anterior to the wall of the abscess-cavity. The cavity was thoroughly irrigated with saline solution, and after the insertion of a good-sized rubber drain in the most dependent angle of the wound, its extremities were closed by interrupted chromic-gut suture.

Postoperative.—There was immediate relief of the pain and tenderness and a gradual subsidence of the fever. The abscess-cavity rapidly contracted, and at the time of discharge, three weeks later, only a sinus two inches in depth remained. This subsequently closed. June, 1903. Patient has enjoyed health during the past six months.

Case XXII.—M. C., aged twenty-eight years; admitted to the Presbyterian Hospital October 2, 1903. Patient has always been a moderate tea-drinker. Previous history negative until five months ago, since which time the appetite has been poor and the patient has been disinclined to eat solid food. There was no pain or vomiting, however, until one month ago. At that time a sharp shooting pain developed in the epigastrium, coming on suddenly in attacks of several minutes' duration without reference to the ingestion of food, and radiating in every direction. These symptoms were not sufficient to confine the patient to bed, nor was there any vomiting until the night before admission. At that time, the pain suddenly became very intense, and vomiting developed and was continuous. There was syncope, and the patient was obliged to discontinue work. The vomitus consisted of partially digested food, and afterward of mucus. At no time was there hematemesis of blood in the stool.

Examination on Admission.—The entire abdomen is distended and very rigid, the rigidity being most marked in the upper left quadrant. There is increased resistance of the left costal arch, the rigidity being most pronounced in its

upper portion near the junction of the eighth and ninth costal cartilages. The abdomen is everywhere tender, especially at a point about three inches above the umbilicus and just to the left of the median line. The abdomen is everywhere tympantic, and there is loss of liver dulness. The patient lies in the dorsal position with the thighs flexed, and any lateral movement of the trunk or extension of the thighs is very painful. The pulse varies from 105 to 120, the temperature ranged around 101° F. The patient's general condition bordered on collapse.

Operation (Gas and Ether).—Median incision, extending upward from the umbilicus a distance of three inches. The opening of the peritoneal cavity permitted the escape of a large amount of gas, which was free from odor. A small amount of serous fluid of neutral reaction was sponged away from the anterior surface of the stomach, which presented in the wound free from adhesions. The depression of the anterior surface of the stomach from the parietal peritoneum in the direction of the pylorus was followed by the escape of an increased amount of fluid of neutral reaction. It was more turbid than that originally observed on opening the peritoneal cavity. The pylorus was, however, free from perforation. Through a small opening in the gastro-colic omentum, the posterior surface of the stomach and the lesser peritoneal cavity were then found to be normal. The stomach was now depressed toward the cardiac extremity, and the escaping fluid became markedly increased in quantity as well as in turbidity, and contained particles of partially digested food, disclosing shortly the presence of a perforation about three inches from the cardia and midway between the greater and lesser curvatures. The adjacent fluid was of distinctly acid reaction. The perforation was about the size of a lead-pencil, and the edges of the orifice were well defined and soft. No induration could be detected in the adjacent stomach-wall. A purse-string suture of chromic gut was taken in the healthy wall of the stomach and the orifice closed. Two Lembert sutures of silk were then inserted over the tightened purse-string suture, and the adjacent peritoneal cavity carefully cleaned. After the insertion of drains down to the pylorus and point of perforation, the remaining portion of the abdominal wound was closed.

Postoperative.—Some nausea and vomiting for twenty-four hours. The pain greatly diminished, and the patient felt very much more comfortable. The evacuation of the free gas in the peritoneal cavity was directly followed by the disappearance of the distention, and the lower half of the abdomen remained flaccid and free from rigidity throughout. The pulse ranged around 120, but was of very much better quality than prior to operation. The temperature remained below 101° F. There was no discharge of stomach contents from the wound, and the patient received increasing quantities of fluid nourishment without pain or discomfort. During the second twenty-four hours the pulse had decreased to 80, and thereafter the progress was very satisfactory. October 12, 1903, Patient's temperature to-day suddenly rose to 103.5° F., the pulse to 120, and in the course of the next forty-eight hours, the physical signs of consolidation of the lower left lobe developed with a serous effusion in the left pleural cavity. This complication ran its regular course, terminating in resolution on the twelfth day. Shortly after, the temperature became normal, and further convalescence was uneventful. At time of discharge the sinus persists, but is superficial, and the patient's general condition is satisfactory.

Case XXIII.—P. G., male, soldier; admitted to Gouverneur Hospital June 15, 1903. Previous history negative. Patient denies ever having had syphilis. On the day of admission to the hospital, patient, who had hitherto always enjoyed excellent health, was seized with paroxysmal pain in the left abdomen. The pain, most intense on the left side, radiated down the left thigh as far as the knee and also to the opposite side of the abdomen. The patient was obliged to cease work immediately and came to the hospital to obtain relief from the pain, a relief afforded only by the hypodermic use of morphine.

Examination on Admission.—There is a large pulsating tumor occupying the left side of the abdomen. The pulsation is synchronous with the heart-beat and of an expansile character. On palpation the tumor has a smooth surface, and by bimanual examination can be distinctly felt to completely fill the entire lumbar region, extending from the crest of the ileum below to the costal arch above. There is rigidity of the left costal arch, most marked in its lower posterior portion. On ausculation, a distinct systolic bruit may be heard over the tumor. There is no disturbance of the circulation in the lower extremities, nor any asymmetry of the posterior tibial pulse. June 21. There has been no change in the size of the tumor since admission. The pain is so intense that willing consent is given for an exploratory operation. This was undertaken in the hope that an aneurism of the renal or other branch of the aorta might be found which then could be removed by ligation and excision.

Operation (Gas and Ether).—The abdomen was opened by an incision along the outer border of the left rectus, extending for an equal distance above and below the umbilicus. The aneurismal sac was in close contact with the parietal peritoneum and had a thin wall. It extended from the spleen above to the iliac fossa below, and involved the aorta from a point just below the diaphragm to within two inches of the bifurcation. The abdominal incision was closed with some difficulty owing to the pressure of the sac against the abdominal wall. For one week the patient experienced great relief from the pain. Then the pain recurred with its former intensity. Three weeks after the operation, rupture of the sac took place through the upper part of the healed incision, and death resulted from hemorrhage.

REMARKS.—The cases of surgery of the liver

here reported, constitute a very large group of those cases in which the symptom of costal resistance may be elicited. In those of acute character, such as abscess and inflammation of the gall-bladder, the symptom has been invariably obtained. It has also been obtained in many other cases of cholecystitis, the histories of which are purposely omitted because no confirmation of the pathological condition could be obtained, resolution either taking place or no operation being performed. In many cases of chronic inflammation, especially those associated with cholelithiasis in which the diagnosis was confirmed by an operation done in the interval between attacks, no costal resistance could be obtained, although the wall of the gall-bladder was found in a thickened condition and otherwise showed chronic inflammatory changes.

In neoplasm the symptom is of value only when the liver is materially increased in size as in Case VII; on the other hand, in cases of carcinomatous metastasis no definite change in the degree of costal resistance can usually be elicited, although the mass may not infrequently be palpated below the border of the arch.

Such malignant growths are, however, rarely if ever operable, whereas in abscess and acute cholecystitis, operation is not infrequently imperative. It is precisely in this latter group of cases, in which the presence of increased costal resistance is most constant. It is here often of the greatest value in making a differential diagnosis between acute liver and gall-bladder affections, on the one hand, and acute appendicitis, on the other, especially when the inflammatory process is so intense as to provoke symmetrical contraction of the entire rectus muscle. Under these circumstances the presence of costal resistance almost always excludes appendicitis. It is also desirable to call attention to the fact that, in subacute cholecystitis, manifested by local pain and tenderness with complete absence of all constitutional symptoms, a considerable degree of costal resistance is present.

Any detailed reference to the clinical features of these cases is foreign to this paper. At the same time, Case XV, in which an abscess developed in the left lobe of the liver some three or four weeks after the evacuation of a large abscess in the right lobe; Case XIV, in which typhoid fever was complicated by the formation of multiple abscesses in the right lobe; Case IX, in which acute cholecystitis existed without the presence of calculus, and Case VIII, in cholelithiasis in the quiescent stage in which pressure on the overlying costal arch elicited marked tenderness, are all worthy of special mention. In addition, the extreme variability in the clinical history of the early stages of cholelithiasis not only with reference to the local symptoms but also to the constitutional symptoms as well, should be emphasized.

Only one opportunity has been afforded to observe the behavior of the costal arch in acute pancreatitis. In this case, the presence of increased costal resistance was very pronounced, and indicated more than any other symptom the most advantageous incision for the diagnosis and relief of this most serious lesion. The case to which reference is made is also noteworthy in that prior to the operation as well as for twenty-four hours afterward, the general condition of the patient was most unfavorable to recovery, the radial pulse being nearly imperceptible, and requiring several clyses and infusions.

In cases of pancreatic cyst, the symptom of increased costal resistance occurs only when the cyst is so situated or has reached such dimensions as to lie beneath a segment of the costal arch. In the case here reported, the extraordinary size of the cyst accounted for the unusual prominence of this symptom.

The observation of this symptom in perforation of the stomach is unfortunately limited to one case, although this is one of considerable value in that, notwithstandiing general rigidity of the entire abdominal wall, the resistance of the upper portion of the left costal arch was so much greater than the corresponding segment of the right side, that no hesitation was felt in making the incision above the level of the umbilicus. Shortly after another opportunity to test this symptom occurred in the case of a perforating ulcer in the anterior wall of the second part of the duodenum. Here again the entire abdominal wall was rigid, even when the patient was resting under the influence of morphine; the upper portion of the right costal arch, however, presented increased rigidity, and accurately determined the location of the incision.

Those pathological conditions of the kidney in which this symptom can be elicited are those in which the organ is increased in size or in which there is perinephric abscess. The writer has not yet had an opportunity to test the value of this symptom in acute pyelonephritis, a condition in which the size of the kidney, although greatly inflamed and the site of numerous abscesses, may yet be but slightly increased. One would naturally expect, however, to find this symptom in cases of this description.

In all cases of enlargement of the kidney, whether of an inflammatory or neoplastic character, the increased resistance is invariably most pronounced in the lower segment of the arch, and may be elicited with the patient in either the dorsal position or reclining on his side.

In several cases of calculi in the pelvis of the kidney which were removed by the writer during the past eighteen months, no change in the resistance of the lower costal arch has been noted. On the other hand, in two cases of intermittent hydronephrosis associated with movable kidney, the increased costal resistance was very pronounced. Also in one case of malignant growth of the adrenal, which was of large size, and partially cystic, the presence of this symptom was noted, although the character of the resistance was considerably less elastic than usual.

A careful analysis of the cases here reported

establishes the following conclusions: (1) That the symptom of costal resistance may always be elicited in the acute and subacute inflammatory processes of the contiguous underlying organs. In chronic inflammation of these same organs it is present irregularly, either generally, when the organ is increased in size, or during a transitory exacerbation of the chronic inflammatory process. In neoplasms or cysts, increased costal resistance may be obtained only when the tumor has reached a sufficient size to mechanically interfere with the movement of the arch. (2) That the degree of resistance is in direct ratio to the intensity of the inflammatory process. (3) That the increase of costal resistance is most marked in that segment of the costal arch which is closely situated to the original point of infection, or, in the case of neoplasm, to that part of the arch which lies over the most prominent part of the tumor. (4) That its value as a diagnostic symptom is greatest in pathological conditions invading the upper half of the abdominal cavity, especially of the liver, the stomach, the pancreas, the gall-bladder, the spleen, the duodenum, the kidneys, and in extensive aneurism of the abdominal aorta. The writer has had but little opportunity to observe this symptom in supradiaphragmatic processes. In cases of empyema, the abscess-cavity is generally encapsulated and does not usually occupy the lowest part of the thoracic cavity. Only when so situated is there resistance of the costal arch proper. In higher positions, any difference in the rigidity of the overlying rib or ribs is very difficult to detect and unsatisfactory. (5) That the presence of asymmetry in the elastic recoil is very much less frequently observed than asymmetrical increase in the costal resistance, the former being present only in cases of cysts, neoplasms, and inflammatory exudates in which the acute symptoms have subsided, while it is invariably absent in all the acute and subacute inflammatory. (6) That with the subsidence of the inflammatory process whether by radical or palliative procedure, the costal resistance again returns to its normal condition. (7) That the presence of this symptom is very valuable not only in facilitating accurate diagnosis, but also in serving as a useful guide to that incision through which the inflammatory focus may be most rapidly exposed and satisfactorily treated. (8) Finally, that proper and skillful technic in determining the presence or absence of this symptom may be easily acquired, and that, therefore, the application of the symptom may be utilized by the general practitioner and not confined to those engaged in the pursuit of any particular specialty.

Patient with Sutured Heart Leaves Hospital.—Thomas Emerson, the colored man for whom Dr. F. T. Stewart sutured a stabwound of the heart some two months ago, has been discharged from the Jefferson Hospital. For a time it was feared that an attack of pneumonia that began some days after the operation would prove fatal, but the patient fortunately recovered from both the wound and the complication.

A NEW METHOD FOR TRANSILLUMINATION OF THE STOMACH BY MEANS OF FLUORESCENT MEDIA: THE VALUE OF FLUORESCIN WITH A RESEARCH INTO ITS PROPERTIES.

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CONSULTING PHYSICIAN, GASTRO-INTESTINAL DISEASES, MANHATTAN STATE HOSPITAL, WEST WARD'S ISLAND; PHYSICIAN DEPARTMENT OF GASTRO-INTESTINAL DISEASES, ST. BARTHOLOMEW'S CLINIC, ETC.

DRS. CANNON, MORTON and others have already called the attention of the profession to the value of the internal administration of a fluorescent medium such as quinine, in order to enhance the action of the X-ray. The present article, however, has nothing in common with the latter. In the course of a series of experiments with transillumination of the stomach, the method of which Einhorn is the originator, I found that the employment of a liquid fluorescent medium, such as quinine bisulphate, gave better results than when plain water was used. In these cases, the patient drinks the fluorescent medium, is conducted into a dark room, and the electric light bulb is inserted into the stomach in the usual way.

For the past four months, demonstrations of the use of fluorescent media for stomach transillumination has been given at my Clinics at the Manhattan State Hospital, West, Ward's Island. During the first demonstrations, bisulphate of quinine solutions were employed, and the method was recently introduced by me, at the Manhattan State Hospital, East, Ward's Island, on the service of Dr. William H. Thomson, for whom I am visiting this institution at the present time. The technic was also described by me at a December meeting of the Post-Graduate Medical Society in this city, and an abstract was given to the *Post-Graduate Medical Journal.* An abstract of my subsequent experiments was given to the *New York and Philadelphia Medical Journal,* but the present article is the first *complete description* of the experiments so far published. My associates, Drs. John E. Traub and C. T. Graham-Rogers, were of invaluable assistance to me, and I am also much indebted to my friend, Prof. Achilles Rose, of the Post-Graduate Medical School. I am further indebted to Drs. Delacroix, R. Haviland and Meager of the hospital staff.

I shall first refer to the media that are suitable for stomach transillumination. I have at hand the names of at least half a dozen other fluorescent media, but they have never been administered internally and no literature is practically obtainable from the manufacturers. Further original investigation will therefore have to be carried out, as regards their properties and toxicity.

FLUORESCENT MEDIA.

1. *Quinine.*—Quinine bisulphate is more soluble and therefore preferable. Dissolve gr. x. quinine bisulphate in a glass of water and add to this ♏ v. acid phosphoric dilute. This seems to increase the fluorescence. Dilute sulphuric acid ♏ v. added to the quinine solution also increases

its efficiency, but the phosphoric acid gives better results. The patient drinks the glass of fluorescent water, follows it with a glass of plain water, and is then conducted into the dark room for examination. In daylight the color of the solution is a faint violet, the reaction acid and the fluorescence slight, as compared with the media now to be described. Transillumination of the stomach with quinine solution, however, gives much better results than with plain water.

2. *Horse-chestnut.—Æsculus hippocastanum. Cortex hippocastani.*—Native of Asia, now grown in Europe. See U. S. Dispensatory, 1900, etc. *Esculin,* a bitter principle obtained from a decoction of the bark. Space precludes a description of the process. The crystals are shining white, prismatic, inodorous, bitter, slightly soluble in cold water, more so in boiling water; soluble in alcohol and in alkaline solutions.

In France the fixed oil extracted by ether, has been administered in rheumatism, as has also a decoction of the bark. A decoction of the leaves has been employed in whooping-cough.

Esculin in gr. xv. doses has been given in malaria. It is therefore *safe* for internal administration. Morton and others have demonstrated its fluorescence with the X-ray. Morton states that an infinitesimal dose in an alkaline solution will fluoresce. One could use therefore gr. ⅛ to gr. ¼ esculin in a pint of alkaline solution (sod. bicarb. gr. xx. to gr. xxx. dissolved in one pint of water) as a fluorescent medium. Esculin, however, is practically impossible to secure at the present time, and Dr. Achilles Rose has suggested a decoction of the *fresh shells* of the horse-chestnut for the purpose of securing a fluorescent medium for transillumination. It is claimed that the American horse-chestnut possesses convulsant properties.

The most marked fluorescent medium with which I have thus far experimented is fluorescein (fluorescin).

3. *Fluorescein* (*Fluorescin,* Merck & Co. $C_{20}H_{12}O_5$) is manufactured from phtalic anhydride (a naphthalin product) five parts and resorcin seven parts, heated to 200° C. It is a red, or dark red powder soluble in alcohol, giving a yellow-red color and green fluorescence. It colors the cornea green, or rather fissures thereof, and has been employed by oculists to detect corneal ulcers. A solution gr. x. to ℥i of water containing sodium bicarbonate is non-irritant. The above is from the U. S. Dispensatory, 1900. I have so far been unable to obtain any literature, or further description of its properties from the manufacturers. Morton and other X-ray specialists have demonstrated its fluorescence. The above facts, I believe, are all that are known about fluorescein (fluorescin).

Therefore, before employing this preparation for internal administration, further investigation of its properties became necessary. The following researches were therefore instituted by me. The experiments with animals were conducted in the laboratory of the Physiological Department of Columbia University. I was assisted by Mr. J. T. Hoyt.

Experiment 1.—One grain of fluorescein (fluorescin) was added to 2 c.c. of 95 per cent. alcohol and to this was added 2 c.c. of sterile water. The fluorescin was partly dissolved and partly held in suspension. This was thoroughly shaken up and then injected subcutaneously into a rabbit. No symptoms followed. The animal was carefully observed for fifty minutes—conditions were all normal and at the end of this period the rabbit was as lively as ever.

Experiment 2.—Two grains of fluorescin were added to 12 c.c. alkaline solution. This consisted of sterile water in which grs. three sodium bicarbonate had been dissolved. Part of the fluorescin was dissolved and part was in suspension. The mixture was thoroughly shaken up and injected subcutaneously into a dog weighing about 20 pounds. No symptoms followed. For a short time the animal apparently had some local discomfort from the amount of fluid injected, but this soon disappeared. The dog was carefully watched for forty minutes, and all conditions were perfectly normal. These animals were kept under observation for twenty-four hours and a careful examination was then made. There were no evidences of swelling, or irritation at the seats of hypodermic injection, and the animals appeared normal in every way. During this period there were no symptoms whatsoever.

On the strength of these experiments, I took a small quantity of fluorescin internally—about gr. ¼—without any discomfort. The facts that small animals such as rabbits and dogs experienced no discomfort from hypodermic injections of one to two grams, also that it is non-irritant to the eye, were sufficient evidence of the safety of its internal administration.

In order to obtain the best results with fluorescin for transillumination of the stomach, it was deemed necessary to further investigate its qualities, the proper quantity to employ in order to secure maximum fluorescence and the influence of hydrochloric acid on the medium.

To Mr. F. N. Ferry, the chemist of St. Bartholomew's Clinic, I am indebted for valuable assistance and suggestions in the following experiments. He called my attention to the value of glycerin to increase fluorescence, and together we conducted experiments in the clinic laboratory. (1) Employing from gr. ½ to gr. i of fluorescin in an alkaline solution of sodium bicarbonate; as we increase the strength of the solution, fluorescence diminishes and colorization of the solution begins and increases. Greater strengths than these, color the solution still more, with diminution of fluorescence. Pint solutions were employed in all cases, as this is the average quantity used in transillumination of the stomach. (2) Gr. ⅛ to gr. ¼ fluorescin in a pint of alkaline solution (water containing grs. xx-xxx sod. bicarb.) gives marked fluorescence; is a fairly alkaline reaction; (3) fluorescin is only ***slightly soluble*** in plain water and gives

a *neutral* reaction with litmus paper, and there is hardly detectable fluorescence with the medium; (4) fluorescin gr. ⅛ with grs. xx-xxx sod. bicarb. in a pint of water plus ʒi glycerin, fluorescence more marked than in (2). Ferry has demonstrated that the addition of glycerin increases fluorescence. If we add another dram of glycerin, fluorescence increases somewhat.

Since the stomach is an acid medium and fluorescence acts best with fluorescin in an alkaline medium, it became necessary to experiment with hydrochloric acid: (*a*) Water one pint in which sod. bicarb. grs. xx, one dram of glycerin and gr. ¼ fluorescin are dissolved; to this add one dram of acid hydrochloric dilute, and fluorescence nearly disappears. On the addition of sod. bicarb. grs. xx fluorescence returns. (*b*) If the original solution contains grs. xl sod. bicarb., and then add one dram of acid hydrochloric dilute, the reaction remains alkaline and fluorescence persists. These experiments further demonstrate the fact that an alkaline medium must first be administered to the patient, and this is to be followed by an alkaline solution of the fluorescin.

Having noted that Hammer, Tracy, Morton and others suggest the administration of radio-active water as a therapeutic agent, and, furthermore, that Morton states that radio-active solutions increase fluorescence, I was the first to suggest to Dr. Morton the *addition* of *radio-active solutions to a fluorescent medium* for the *purpose of transillumination of the stomach.* As soon as a perfectly safe radio-active solution can be secured he has agreed to demonstrate the method at my Ward's Island clinic.

Since Tracy states that radio-activity is well exhibited in normal saline solution, as a preliminary investigation, I tried the effects of normal saline solution with fluorescin. (1) Normal saline solution one pint plus ¼ gr. fluorescin—alkaline reaction, slight fluorescence. (2) To the same solution add grs. xx sod. bicarb. and fluorescence increases; (3) add to this one to two drams of glycerin and it increases more rapidly and markedly; add one dram of acid hydrochloric dilute and fluorescence diminishes somewhat. Then add grs. xx sod. bicarb. and fluorescence increases.

We have, therefore, ready for further experimentation a fluorescent solution suitable for displaying radio-activity. Accurate investigation into the degrees of safety of the latter and not mere theorizing is now necessary, before employment of the radio-active solution. The saline fluorescent medium itself is perfectly safe. Finally further careful experimentation developed the fact that gr. ⅛ of fluorescin to the pint of alkaline solution with a small amount of glycerin, gives the best results.*

Recently at my Tuesday Clinic at the Manhattan State Hospital, West, Ward's Island, the method of transillumination of the stomach with fluorescin was performed on two patients in the presence of Dr. Achilles Rose and other physicians. The results were the most satisfactory that I have ever seen, and I believe that in this we have so far the ideal method of stomach transillumination. Absolutely no disagreeable results in any way followed. It is unnecessary to aspirate out the fluorescent medium, unless the Rose's belt is to be applied, in which event it is preferable, as it is more comfortable for the patient. Two patients have recently been examined at the Manhattan State Hospital, East, Ward's Island, by the same method and with success.

The method is as follows: The patient is given a glass of water (eight ounces) in which xv to xx grs. of sodium bicarb. are dissolved to neutralize stomach acidity. This is then followed by another glass of water (eight ounces) in which are dissolved grs. xv-xx sod. bicarb., one dram of glycerin and gr. ⅛ of fluorescin. The patient is then taken into the dark room and the Lockwood electric light (gastrodiaphane) is introduced like the stomach tube. This instrument is extremely small, gives a brilliant light, and when manipulated in the stomach hardly ever gags the patient. A certain amount of manipulation is necessary in order to determine the lower margin of the stomach at the point of maximum intensity of the light. By pressure on the abdomen and manipulation in forcing the light into the organ for the full length of the carrying tube, the lower border can be accurately located. Moreover, manipulation is at times necessary to determine the relations of the lesser curvature to the diaphragm, a point of differential diagnosis between simple dilated stomach and gastroptosis. With the new method of transillumination with fluorescent media, especially with fluorescin, this is generally unnecessary, and comparing the results with those of water, as formerly employed, I believe the improvement to be marked as well as a scientific advance. The differentiation of tumors of the stomach, liver and intestines is rendered easier, I believe. As far as I have been able to investigate the literature, I cannot find that this method of transillumination of the stomach has been heretofore employed.

Before concluding, there are other qualities of fluorescin which I should mention: (1) The fluorescence of the prepared medium increases, the longer the exposure to light; hence it is advantageous to prepare the solution half an hour or more before use, though this is not necessary; (2) the powder is so extremely light, that powders of gr. ¼ can readily be made up and these easily subdivided into gr. ⅛ at time of use; (3) the fluorescent medium leaves a slight yellow-red stain on the hands which can be readily removed.

In conclusion, let me say that there are certain interesting problems that suggest themselves to us from this work: (*a*) The use of a radio-active solution in the fluorescent medium for stomach transillumination; since Morton demonstrates

* By recent experiments I find that lime water ʒij may be administered in each glass of water, as a substitute for the soda bicarbonate. Laparotomy on a case of gastroptosis transilluminated with fluorescin at the West Hospital, has recently demonstrated the absolute accuracy of the method.

that a radio-active solution increases fluorescence; (*b*) the radio-active solution in the fluorescent medium might itself give us a picture of the stomach in the dark room, by use of the fluoroscope alone. (*c*) The possibilities of thus photographing the stomach either with or without the accessory of the X-ray apparatus, by using the radio-active solution with fluorescence internally.* Fluorescin, as I have demonstrated, combines well with a normal saline and soda solution. (*d*) The possible value of the non-irritant fluorescin solution in the bladder, for the purpose of improving the scope of cystoscopy and an investigation as to whether such a solution would enable us to detect minute ulcers, or fissures in the bladder, just as in the cornea.

Whether fluorescin has been given for therapeutic purpose, I cannot state positively, though so far I have been unable to find any record of the same, nor had its manufacturers any record of its internal administration, as I have heretofore stated. I trust, however, that these researches and suggestions may prove to be of some value to the profession.

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THE SCOPE OF PHYSICAL ECONOMICS: AN INQUIRY INTO THE POSSIBILITIES OF ENHANCING HUMAN EFFICIENCY THROUGH PHYSICAL EDUCATION.†

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THE term physical economics, as used here, is intended to embrace the principles through which are to be acquired normal motor energizing, also functional balance, and are essential to bodily and mental well-being. It is an axiom that complete mental energizing is conditional upon adequate physical functionation. The term adequate is used because perfect functionation is not always to be expected, but enough is an elemental requirement. One or other item, or degree, may be lacking, but the norm for the individual must be attained, or maintained in order to preserve intellectual equipoise and practical efficiency. It is a rule, accepted on all sides, that mental balance can only be preserved through a persistent attitude of deliberate watchful control of all the powers. Enough, perhaps, has been said to emphasize the paramount importance of "equanimitas," the serene intellectual attitude most needed in all human effort. Those who have recognized this truth have numbered among themselves the great ones of the earth since the dawn of history.

There have been times, protracted periods, when little attention has been shown in that even greater theme, greater because a primordial necessity, of bodily equipoise through which alone the superior intellectual processes can thrive.

The teachings of physicians deal over largely with the mitigation of ailments, derangements and diseases. Preventive measures have never, not even now, attained the recognition they deserve. To conserve and amplify bodily forces is a pursuit justifying the best attention of all physicians but fails to receive its desert. The church has persistently magnified the Spirit at the expense of the body in all ages; and left an indellible mark, especially on the history of the Middle Ages. Yet a clean body, free from grossness, is needed for a pure spirit. Mere Animal vigor is not what is occupying our attention here. Meanwhile the growth of a movement to place a just appreciation on bodily conformation and well sustained vigor is assuming large and praiseworthy proportions. This movement is healthy and to be encouraged but is, as yet, a mere revolt at worse conditions or restrictions and requires careful guidance. It is worthy of the best attention, the most unremitting study of scientific and benevolent men, who are the only suitable teachers and guides. The awakening of interest in acquiring bodily perfections has begun chiefly among those who are moved more by the stirrings of primordial physical instincts, of mimic war or sports imitative of human struggles, hampered by human passions and appetites, than from a wholesome appreciation of the largest ultimate good. Hence we see vast multitudes sit spellbound at exhibitions of warlike contests on athletic fields, on water sports, on pageants reflecting war or the chase, or even at prize fights, than can possibly be collected, or held, by the exhibitions of artistic, scientific or intellectual men, their preachings, or products.

Hence in the growth of that interest now so widespread in the betterment of individual vigor the movement is reflected chiefly from the athlete and the professional competitor.

The teachers and (*mirabile dictu*) the writers on physical culture, are composed largely of those who have gained fame as wrestlers, prize fighters, track athletes, fencing masters, and professional trainers or teachers of such matters in the army, drill sergeants, and in colleges, performers on the stage and the like. We can learn much from these men; they furnish a sound, practical basis of principles upon which success has been gained and laurels won in many departments; many of these are well worthy of imitation, it is true, but they often make statements requiring the most careful revision by the educated physician. Just here is pertinent to remark a curious fact, that although the semiprofessional teachers in colleges, the coaches of the baseball and football teams, the track athletes, the oarsman, etc., are often graduates not only of the colleges, but also of the medical schools, they have as yet added little to the literature of physical economics. They are the men who

* By further investigation, I have not been able, so far, to arrive at a positive conclusion that the addition of a radio-active solution to a fluorescent medium at all increases the intensity of the light in transillumination of the stomach. Dr. Sinclair Tousey has photographed for me the stomach of a rabbit filled with radio-active solution combined with fluorescent quinine solution; Medical Association of the Greater New York, March 14, 1904.

† Address delivered before the Association for the Advancement of Physical Education, at New York, Jan. 16, 1904.

ought to act as guides to youth. So far they have done nothing commensurate with their opportunities.

Fortunately, the subject is becoming amplified by the formation of associations composed of those who undertake the scientific pursuit of physical advancement or who have ranged themselves in the rank of lovers of the ideal man or woman, and from their individual and joint efforts and the frank discussion of expressed opinions much true progress may be expected. For them the watchword must ever be high ideals and critical investigation.

The best work can be done by those who have had a thorough medical education, or at least a full knowledge of anatomy, physiology and anthropology. In the absence of such groundwork false conclusions are likely to be reached; errors various and disconcerting will be made. Certain individuals of my acquaintance, non-medical, have taught me a great deal of value; many special "courses" have I taken, hoping greatly but rarely learning much. Occasionally the light is flashed here and there on new realms of thought. We are still on the threshold and must win our way by honest individual and mutual self searchings.

Let me offer a few thoughts on those salient, or rather fundamental, principles, which seem to constitute the objective points of our search. A wise friend, not long since, in a discussion of things grave, expressed his surprise that the one distinguishing quality or attribute of Christ had, so far as his researches taught him, been overlooked. This is poise, which may be described as the maintenance of a justly proportionate energizing of all vital forces of body, mind and Spirit.*

The divinity of Christ was enshrined in a human organism of perfect proportions and powers. We need no better proof of this assumption than is afforded by the description of His life and human acts as recorded in the Gospels.

The material part of Him could obviously sustain no improvement. No one can read the Gospels, as a believer or skeptic, and fail to note his splendid symmetry, reserve power, coordination of mind and body; in short, his perfect poise.

So it is that man, in whose image he is clothed. can do no less than strive to acquire so much of similar perfectness as his individual endowments enable him to attain. The word, then, which more nearly describes the physical and mental completeness of the perfect man, is poise. It should be our aim to secure this attribute for those in our keeping. By this standard alone we measure fullest human efficiency.

In estimating the factors which make success, and providing standards, let us leave out always the extreme types of superiority, the product of reprehensible specialization such as the triumphant financier or champion prize-fighter.

It is our prerogative to equip the individuals in our keeping with the highest vital dynamics. To do so, it is imperative to assume an ideal toward which always to strive. This ideal should be understood and defined as fully as possible. The qualities we desire to confer should be formulated accurately in our own minds. In our solution of the individual problem full consideration must be given to age (actual or relative), sex, antecedent history, vital resistance, constitutional or acquired weakness or damage, social or racial habits, and, above all, a study of temperament.

We are called upon, perhaps, more often to improve the bodily condition of those who are of fairly good constitution and relatively young, but full grown. The very young are, or should be, under school trainers who need all the wisdom possible, as theirs is the opportunity of molding during the period of plasticity.

Our first consideration should always be to search out the acquired faults of posture, limitations in range of movement, the coordination disabilities, to note short comings in symmetry, in hypertension or overrelaxation and all developmental defects. We should always define the equation between the force and accuracy of voluntary and involuntary acts, and determine whether less or more are required to accomplish desired results. Some people, indeed, the majority, fall early into habits of inaction, involving if not the whole, then some considerable part of the body, through which a large train of degenerative phenomena arise in certain tissues; others, and many under emotional strains, exhibit a prodigality of action most wasteful of nerve force and are thus constantly on the verge of exhaustion. The value of the exercise of economy in vital forces is fully appreciated by drivers of draught animals, by athletes, and the employers of labor in all fields.

Some men and women who assume heavy responsibilities are fully alive to this elemental economic principle also for themselves; but, alas, too many do not appreciate the individual application. In proportion as they learn this truth, and act upon it conscientiously, they become and remain efficient.

What profits it if one shall become a great power for accomplishment, in some special direction, if he lose health or capacity for sustained effort? This problem of the relationship of work to the capacity for effort and its corollary nerve tire, is of deep importance and my teachings in this line are on record. My thesis is the scope of physical economics and the central thought of mental and physical poise must never be lost sight of in aiming at consummate fitness. In acquiring poise the perfect adjustment of effort in any direction to result or product we must first consider early development, next, middle age development, and finally, the reacquirement of so much of our latent capacities as is possible, consistent with the age reached and the disabilities already accrued. Herbert Spencer makes the assertion that the marvelous motor and sensory acumen of the Indian hunter, trained from childhood in observation, in patience, in niceties of physical and mental adjustment, required by a

* This observation is confirmed by several learned clergymen.

struggle for existence in a primitive state of society, can never be paralleled by any imitation. All this is true, but it is also true that higher intelligences, as found among Circassians, are capable of special training and adaptation which can, and do, equal the physical powers of the Indian in most particulars and excel in some.

A thorough education of the central nervous system, the foundation of sensory and motor training especially during the period of plasticity, is an absolute essential to the attainment of even relative perfection in any line.*

It must not be overlooked, however, that immense advantages follow efforts to develop dormant powers late in life. The whole progress of ageing is one of development. Only toward the end of a long life in one structurally sound can the phenomena of decadence be said to arise, and even then the tissues are capable of much wholesome modification. Old people are susceptible of decided physical improvement by systematic attention. It has frequently happened in my experience that an elderly person seeks advice for obtrusive evidences of weakening which brings to notice the fact that, while pursuing life's work, specializing possibly in intellectual directions, no commensurate care was taken to maintain the body in proper standards of excellence. Providence is trusted contentedly to continue his gifts of physical health. Meanwhile no effort may have been spared by the individual to bring the mental powers to the highest plane of efficiency. Under the age of seventy years, it is usually possible to find a virgin field for improvement. After that period much can still be accomplished. Often in those who distinctly evince a diminution of vigor not only can extraordinary rejuvenation of physical powers be enjoyed, but, as the structures regain lost or previously developed tone, the blood and lymph being purified and oxygenated by stretching movements, many cells long suffocated become alert, and a new order of things arises in mind and heart. The stream of life flows more clearly, more cheerily, no longer the muddy current, the offensive stagnant pools. All nature takes on new colors, new shapes, and, above all, new hopes and capacities for enjoyment awakened.†

Again, let us consider those persons who have suffered some grave organic damage of lung, kidney, heart, digestive organs, nerves and the like. The time was, not so far away, when for these the fiat went forth that such sufferers must content themselves to be set apart, to live a life limited to fewest activities.‡

In all these and many more conditions of seemingly irrecoverable organic disability, it must be remembered that the best form of movement cure is that which is made by the physician pulling and rotating. This much-neglected passive education, even in those capable of much activity, admirably furnishes training for the joints which are thus reset and remobilized, venous and lymph stases are relieved and great comfort is afforded to many forms of disability, large and small. The physician should begin, and himself apply much of the passive movements in many instances. There is still an ample field for the skilled masseur.

The scope of physical economics can scarcely be bounded. Thoughtful men, medical and lay, will develop the theme increasingly, each according to his taste, capacities and originality. Certain definite principles must govern. It appears to me a few objects and standards of excellence should be formulated. The primary aim should be to acquire right posture. There may be differing opinions as to what this is, but a suitable model is a youth, or a maiden, of about ten or fifteen years, untrammeled by costume or occupation deformities, and the product of freest opportunities for physical activities, where the stimulus of most varied effort is duly modified by the overcoming of difficulties.

Again, whenever contractures, due mainly to hyperconsciousness or asymmetrical tensions, confining occupations or disease have marred the organism these must be corrected and removed. A point which impresses me as of vital importance in the performance of all regulated movements, is deliberation and accuracy, with intervals of complete relaxation. Rapidity is sometimes called for, of course, but rarely, and should always be subordinated to nicety and precision. Action, to fulfil these requirements must be by an organization whose parts, both the central and peripheral, are in normal adjustment. Whenever it seems to be otherwise, the inevitable conclusion follows that with improvement in adjustment an amplification of efficiency will follow. Again, in the performance of evolutions, single and complex, the best single principle of action is the parabolic increment of intensity from lightest poise to fullest tension, such as the exquisite elaborate action of the fencer's thrust. A very brief period of exercise daily, augmenting extensor action for the arms and flexor action for the legs; repeating accurate movements, normal in direction always, but of the widest variety, each act as a geometric increment from poise to complete contraction, will do more to regain symmetric tone and educate motor centers, in brain as well as muscles, than hours spent in dawdling field sports.*

For the remedying of a vast array of disabili-

* This topic has been ably treated by Prof. Halleck, of Yale, in a small book which is not too elementary for anyone to read with advantage.

† See paper by this author: "Conservation of Energy in those of Advancing Years," in the Popular Science Monthly, Feb., March and April, 1904.

‡ The author read a paper at Washington on the treatment of chronic heart disease in children by regulated movements. In the discussion little encouragement was meted to his views. One of New York's most distinguished masters in medicine declared such opinions dangerous or worse, yet, some before and many since, have advocated carefully supervised activities for those of damaged hearts. Some risks may possibly be run, not grave ones; but consider on the other hand the deprivation of rational pleasures thus imposed; the rapid degenerative changes following in all organs, if the blood stream is not encouraged to become freshened by natural outlets of energy. The author's earlier days were spent in the office of the greatest neurologist of America, a man who is wiser than his colleagues in recognizing the efficacy of passive and active movements, yet for years the opinion prevailed even with him, that locomotor ataxia should be treated by almost absolute rest. Now Fraenkel and others have specified certain active exercises for this disorder as necessary to recovery of health.

* No disparagement is intended of the utmost utility of field sports

ties, large or small, in old or young, in brain workers or in laborers exhausted by monotonous physical toil, no agency is capable of affording so much relief as a scientific application of the broad principles of physical economics.*

Many of those who consult the physician describe themselves as fairly well but easily fatigued by slight exertion; in fact, while far from strong, they are free from definite organic disease. The custom is to treat such folks by rest, extra care as to exertion or exposure, tonics and forced feeding. A large proportion of these disappoint both us and themselves, remaining below par indefinitely after having exhausted the resources of more than one excellent medical adviser. Even when certain organs are deranged, or convalescing from acute disease, many of these people will recover entirely and promptly, provided the motor activities are called into use in such a fashion as shall encourage a return of full circulatory balance, not only in tissues and organs disturbed, but also by restoring the normal circulation in these segments of the cord whence they are innervated.

In short, scientific medicine, working with all its resources at command, often reaches the limit of progress toward health. Then, if we have recourse to the possibilities of what may be termed physical economics, large, timely, and often unexpected gains can be made. Practical physical economics may be described as a scientific study of the normal bodily movements in direction and force and employed in such a fashion as shall best supply the needs of the organism, holding in careful consideration the disabilities present, using only those measures and so much of them as shall be admissible, and increasing them wisely in force, repetition, frequency and breadth as shall secure the desired results.

This work cannot be delegated by the physician to any other person; he should be the one to determine the manner, and amount of such activities based upon his knowledge, first, of the natural history of disease, and second, of the possibilities of tissue activities, normal relationships and coordination, and third, a careful estimate of the defects in original development of the patient and the acquired deformities. When the problem has been outlined from adequate knowledge of both suitable standards, and a formulation of the special needs and possibilities of the case, it will be found that not only can results be secured far in advance of the ordinary methods employed, but that the scientific resources of the physician are by this taxed quite as fully. The reason why physical readjustments and restoration by passive and active manipulations, and reeducation in normal activities are held in such small esteem by the profession is plain. The fact is, that few physicians know anything about the matter and are disinclined to learn, contenting themselves in covering up their ignorance by belittling the value of the subject. Their interest may have at one time been aroused in allied subjects, or if still extant, usually takes the form of mere amusement in certain forms of athletic games or sports. In these they acquire a superficial familiarity, but rarely give their attention to those fundamental laws of the motor activities which would fit them to act as guides or experts. They do not understand what the body is capable of, hence they cannot know how to restore its powers. A few are aware that something of value can thus be accomplished, but, conscious of their shortcomings, employ one sort or another of physical trainer through whom probably more good is obtained than harm wrought, but it is a slipshod method at best. Even the orthopedic surgeons, to whom problems of advanced deformity are sent, rarely realize the fundamental problems submitted and content themselves with routine procedures applied by hirelings, not medical experts, and the use of supports and corrective apparatus, the cutting of tendons and other operative measures.

By far the larger number of those for whom corrective exercises are needed either go without or seek on their own recognizance various self-styled physical culture experts and thus often secure much betterment but oftentimes some harm, and rarely get what they actually need. If one will reflect a moment and take a broad view of the subject of physical efficiency it will be patent that we are now in a transition stage which must be followed by a fuller realization of the gravity of the problems involved. It is possible to demonstrate the fact that the scope of physical economics is vast and of vital importance, but practitioners of medicine have been curiously indifferent.

A consequence of this is that the public fails to regard medical practitioners as authoritative in a broad field of influence and, becoming aware of its needs, seeks advice at the hands of bold claimants who strive to justify their assertion that by regulated exercises and manipulations an enormous array of discomforts and disabilities, both minor and major, are relieved or cured. Thus is medical potential lowered, respect for the resources of medical art is lessened, and much harm done to the esteem which should be our prerogative. If the profession generally cannot, or will not, realize the gravity of this position and study this clearly definable branch of therapeusis, at least they could encourage a few to make it a specialty and give them the cooperation extended to the well-recognized forms of specialization and accord them the same trustful mutual interchange of courtesies. If not, then much work which could, and should, be done by skilled physicians will drift off to irregular practitioners who are not slow to sneer at our limitations.*

as occupying time and supplying motor coordination, air and sunshine: but form is here required to get the best personal results.

* Not the least utility of the teachings of physical economics, is that which accrues to the teacher. Attention along wholesome lines is retroactive and makes for his or her betterment. It seems to me the plain duty of the experts, is to embody in themselves the principles taught. His or her person should stand as an example of complete poise and be made to improve steadily as time progresses, and serve as a constant evidence of the conservation of values.

* See article by the author, "Remarks on Mechano-Therapy, Bone Setting and Osteopathy," New York and Philadelphia Medical Journal, Dec. 16, 1903.

Let me make a few remarks which will serve as the equivalent of case citations and then proceed to offer a few fundamental principles of physical economics.

It would seem that among children few instances occur requiring systematic readjustments, unless from the effect of congenital or profoundly disabling disease, yet my experience for many years has led me to recognize and correct many minor disabilities and to train these folk into efficient individuals. Small defects, arising during the plastic years, readily grow into larger ones and are only too rarely "outgrown" spontaneously. It is my pleasure to feel I have deflected much material from future orthopedic clinics by correcting deformities in their incipiency. By this means also organic maldevelopments are saved, especially of the lungs and heart which are dependent for full capability upon a roomy elastic thorax. Many organs are subject to mechanical disabilities in the abdominal cavity where a brace in time may spare many ptoses. These ptoses, relaxations and displacements of the abdominal organs are now recognized to be both numerous and significant. Most of these are distinctly more preventable than curable. The prevention is easy by conferring normal tonicity upon the supporting tissues, and the fundamental requisite is symmetric central vigor and elasticity of the skeletal structures. Again, a vital requisite is full lung competence; in feeble children or others unable to take adequate exercise the lungs fail of full expansibility. By breathing exercises and by developing the elasticity of the thorax, arms and shoulders great gains can be made and the capacity of oxygenation amplified. Again, for a long time I have treated many organic troubles in children, even those of the heart, by regulated movements as stated before, by which compensation is much earlier obtained. By passive followed by gentle active movements much discomfort is saved to the cardiac sufferer, passive congestion relieved, organs and muscles brought to a higher state of efficiency, and the joy of vegetative existence increased. Often fuller activities are made possible. In short, the poor disabled creature is invited to become a part of the scheme of life, not a mere incubus or excrescence on the body politic.

No effort can be economically expended without the compensatory action of relaxation, by periods of complete rest, or cessation of voluntary action. These intervals of rest to be effective must be as nearly absolute as possible, and of much longer duration than the time occupied by tensions.

It is a prerequisite condition of motor efficiency to acquire full power of complete relaxation, and must be the first qualification striven for. This accomplishment, once acquired, will fit one to immeasurably save nervous force for expenditure in specific directions and to secure the largest results.

If tension be maintained for a moment longer than is needed the reserves of energy are being squandered. This prodigality of energizing may be expended consciously, but far more frequently without being recognized. In most of us, especially those who are overenergetic, high strung, intense, it is an unconscious attitude, a bad habit which should be sedulously overcome. Among the weak and neurasthenic it degenerates into fidgetiness. Those enviable beings who possess a placid, calm disposition, an imperturbable temper, are always in a position of advantage over others whose reaction time is excessive.

However, it is entirely possible for all of us to imitate them and acquire some degree of this control over our ebullient forces. In proportion as we learn to relax, do we save not only our physical reserves, but improve our accomplishments.

The attitude of physical relaxation is the starting point for all effort. Again, the consequences of overtension result in rigidities and contractures. They are to be found in nearly every human being, old or young, beyond early childhood. The causes are chiefly hyperconsciousness, but others are old toxic irritations, as of gout, fibrositis, rheumatism, the infections, and any irritant reacting on the centers of nervous force.

These tensions, and the resultant contractures, are hurtful for several reasons. They cause continued pressure upon delicate structures such as nerves, blood vessels, and lymph channels by muscle masses and other structures which have become rigid. Cellular interchanges are thus impaired; organs of special sense, as the eye, the ear, and the structures of the throat and nose, all thus frequently suffer structural damage or functional impairment. It is common to find in one who suffers impaired functional competence of one of these organs as of the heart or circulation of the brain, such as headache, vertigo, confusion, insomnia and the like, abundant evidence of rigidity in the tissues of the neck and extrascapular tissues. When the rigidities are removed it frequently happens that these disabilities are often entirely removed. Scores of cases could be cited where the sufferer had employed the best specialists and been for years under the care of leading neurologists—still unrelieved.

The objects to be obtained are plain; these are to acquire elasticity of these hardened tissues, and a capacity to relax. To do so involves careful teaching by one who appreciates the situation and has a practical knowledge of the normal states and capacities of muscles and ligaments. It is accomplished chiefly by passive movements and manipulations and partly by judiciously directed active movements.

To acquire normal attitudes it is absolutely essential that symmetrical elasticity of the tissues be first secured.

Relaxation being gained, or fully appreciated, the principles of physical economics may be outlined as follows:

1. *To acquire normal attitudes.*—Few persons are free from local or general faults of posture and most have acquired deformities.

2. *To overcome contractures.*—It is rare to find one who possesses perfect mobility of limbs, or neck, or other frequently used voluntary muscles, and it is exceedingly common to find the less used joints grievously stiff and contracted, especially the hip-joint and the junctures of the ribs, the origin and insertion of many muscles, deep-seated tendons and ligaments.

3. *To attain full flexibility of the muscles by which alone their competence is established.*—Here relaxation is an imperative condition. Also steady stretching is most effective, protracted till the tensions are overcome, or taught to overcome themselves.

4. *To acquire accuracy in movements.*—Along with deliberation graduated increments of force should be employed, particularly in extensions, which should be from full relaxation in a parabolic curve of force to the perpendicular of extreme tension. This is the chief index of power and on this basis alone is economy of forces to be estimated and conserved. After accuracy is attained speed may follow and then be of some utility. It is desirable also to secure:

5. Full capacity for extension, first passive, and later active, by which the tendons are stretched to their uttermost and through this much improvement is possible, not only in the efficiency of the muscles but also reflexly in the nutrition of the centers, is enhanced.

6. Full respiratory capacity; the basis of oxygenation in lungs as well as muscles. This may be acquired by systematic breathing, rhythmic inspiration and expiration, both increasingly, until by securing invigoration of the thoracic tissues, supplemented by the abdominal muscles and especially the diaphragm, not only is full forced inspiration accomplished, but, of equal importance, fullest expiratory emptying of the lungs. This should expel the last possible remaining complemental air from the recesses of the lungs and greatly enhance the interchange from the residual air.

7. Circulatory capacity, the heart and great veins need development; a long story and attainable through automatic movements repeated to the limit, or by movements of skill, training, balance, accuracy, variety, etc.

8. Capacity for muscular endurance, by repetition of automatic simple acts or variegated movements, such as in fencing, the various games of skill, tennis, squash, handball, etc.

9. Muscle building; of little or no use to those not young or fairly vigorous, but of great importance to those who are markedly weak at any age, provided there is no contraindication.

10. A combination of muscle-building accuracy, endurance, full muscular competence of limbs and heart from such means as fencing, wrestling, boxing, or other dual contests.

It is usually sufficient for any one who desires to pursue physical economics for the purpose of acquiring full bodily efficiency, short of competitive athletics, to work mainly for elasticity and accurate tensions.

MEDICAL PROGRESS.

MEDICINE.

Mathematics of the Diabetic Diet.—That in most cases it is unnecessary and superfluous to entirely withdraw the carbohydrates from the diet of diabetic patients, is the claim made by A. C. Croftan (Jour. Am. Med. Ass'n, March 26, 1904). It is almost impossible to adequately nourish these patients unless the carbohydrate is replaced, bulk by bulk, by other food equivalents. The complete withdrawal moreover of the carbohydrates eminently favors the development of acidosis and precipitates the inevitable consequence of the latter, —diabetic coma. The author claims that mathematical accuracy should govern the regulation of the food of these patients. A normal adult requires from 30 to 35 calorics a day per kilo of body-weight and if this caloric value is not supplied, the body must consume its own tissues and suffer accordingly. Where there is a loss of sugar in the urine the average diet will not furnish the required caloric value. By knowing the daily amount of sugar excreted, it is possible to estimate what proportion of the deficit is made good from the patient's tissues and the diet regulated. It is necessary in each case to determine the tolerance to carbohydrates. Occasionally the sugar is due to too much sugar in the food, but generally to insufficient power in the organism to destroy the normal amount. There are three degrees of glycosuria. One may speak of the mild form, if the sugar excretion stops at once after the withdrawal of the carbohydrates, if it does not reappear when small amounts of the carbohydrates are again administered and if at no time the amount of food albumin need be reduced. In the medium form not only must the carbohydrates be withdrawn completely before sugar excretion ceases, but the food albumin must also be reduced to such a point that less than 18 grams, but more than 10 grams of nitrogen appear in the urine. In the severe form, in order to stop the glycosuria, the carbohydrates must be stopped, and in addition so much albumin must be withdrawn, that less than 10 grams of nitrogen appear in the urine. The diet ordered must therefore maintain the nitrogen equilibrium; *i.e.*, the nitrogen output must never exceed the nitrogen intake. The patient therefore must receive food that, after the deduction of the sugar wasted in the urine, allows him to utilize at least 35 calorics per kilo of body-weight pro die. The author considers however that in certain cases it may be well to give a certain amount of carbohydrates even though the sugar does not entirely disappear, viz., (1) the impossibility of adequately nourishing most patients on a meat fat diet alone, and (2) the increased danger of acidosis and coma incident upon the entire withdrawal of carbohydrates. It is advocated that the diabetic be treated for a time at least in some institution where the case may be studied as outlined above, and the author also decries the method so widely adopted of handing every patient with sugar in his urine, a diet list on which is to be found a list of articles that contain no carbohydrates.

Diagnosis of Pulmonary Insufficiency.—If the examination of a heart case is begun with auscultation, pulmonary insufficiency will often be mistaken for aortic regurgitation since the maximum murmur of the latter is often situated over the pulmonic area. E. Fromherz (Münch. med. Woch., March 8, 1904) auscultates last of all and thus avoids the common error. The absence of the typical appearance, with the peculiar pulse, the retinal pulse and the downward enlargement of the heart so common in aortic disease will make a pulmonary insufficiency very probable, even if auscultation detects a murmur characteristic for the former. In addition, the

right ventricle is considerably hypertrophied. When complicated with stenosis, the second pulmonic sound is weak or absent and the patients are very cyanotic; the prognosis here is very grave. In persistent ductus Botalli the heart is also enlarged to the right and a systolic murmur is also heard over the second or third left interspace, but this murmur occupies only the second part of the systole. It is well demarkated from the second, accentuated sound and as a rule the first sound can also be heard; sometimes the second sound is accompanied by an inconstant murmur. No difficulty is usually experienced in differentiating from pericarditis or from extracardial murmurs such as occur with typhoid, rheumatism and chlorosis. In severe cases of mitral stenosis, a relative pulmonic insufficiency may occur and very rarely both aortic and pulmonary valves are diseased.

Typhoid Bacilli in Urine and Feces during Convalescence.—The occurrence of virulent typhoid germs in the urine and feces of convalescents from typhoid is of the greatest importance in the prophylaxis of the disease. According to D. HERBERT (Münch. med. Woch., March 15, 1904) the urine is a greater source of danger than the feces, since bacilli were found in 18 per cent. of the former and in only 3 per cent. of the latter. The last positive cultures were obtained in from eight to twenty-seven days after the cessation of the fever, the average being fifteen days. With one single exception the excreta were harmless during the second month of the disease. The technic is very simple: a small amount of the fresh urine or stool is simply plated on the special medium of Conradi and all suspicious blue, glassy colonies are tested for motility and agglutination. The appearance of the colonies alone will often warrant a diagnosis.

Influence of Hydrochloric Acid on Pepsin in Stomach.—If a dilute solution of hydrochloric acid is introduced into the stomach, a large amount of the fluid, still of high acidity can be expressed after one-half to three-quarters of an hour while the same amount of water without acid will have disappeared in this time. According to A. HEICHELHEIM and M. KRÄMER (Münch. med. Woch., Feb. 23, 1904) the acid has a pylorospastic action which is most marked in hyperacidity and absent altogether in achylia when the contents of the stomach are very rapidly emptied unless stenosis or atony is present. In carcinoma of the stomach with absence of free hydrochloric acid a small amount of pepsin could always be detected after a simple test-meal, but a larger amount was always found if hydrochloric acid was first given, as this converted the pro-ferments into ferments. The same was also observed in achylia without carcinoma but to a much less degree and in a few cases with complete absence of pepsin, the acid had no effect. In normal cases the amount of pepsin was generally diminished if the test-meal was preceded by acid since this brought about an extraction of the gastric mucous membrane. In some cases of cancer, the expressed acid contained blood where previous test-meals had always been free; since this was never observed in simple achylia, it may help to a diagnosis where a palpable tumor is not present.

Typhoid Agglutination in Jaundice.—The fact that the blood of jaundiced patients will occasionally agglutinate typhoid bacilli, has considerably diminished the value of the Widal test. Though many such observations are on record, a true explanation of the phenomenon has not yet been given. Taurocholic acid seems to be the only constituent of bile which occasionally causes clumping but negative results are obtained with the blood-serum of patients treated with this substance. In the following cases M. STEINBERG (Münch. med. Woch., March 15, 1904) found agglutination in a dilution higher than 1-40: six of catarrhal jaundice, two of cholelithiasis, four of tumor, one of acute yellow atrophy, one of sepsis and one of febrile icterus; very high values were, however, obtained only where the patients had had typhoid some years ago. It is most likely that the jaundice itself is not responsible for the agglutination but the bacterial infection which exists in most cases of icterus. Typhoid bacilli are not only agglutinated by typhoid serum but also by the serum of patients differing from paratyphoid, colon, proteus and even staphylococcus infection. It certainly seems more plausible to accept this as explanation than to assume that disturbance of hepatic function so alters the blood-serum that it assumes agglutinating properties.

Urine in Lead Poisoning.—In a large number of cases of chronic intoxication with lead K. KLIENEBERGER (Münch. med. Woch., Feb. 23, 1904) invariably found elements pointing to a nephritis. The frequent presence of granular renal epithelium and typical granular casts with only few leucocytes and red cells seems to be characteristic for the acute phases of chronic saturnism so that a parenchymatous nephritis must be assumed. This nephritis has no tendency to disappear spontaneously since it depends upon severe lesions of the renal cells.

Causes and Treatment of Chronic Rheumatism.—Acute rheumatism is considered by many to be an infectious disease. There is no particular reason why it should be mentioned in the same breath with a very different disorder, chronic rheumatism. RALPH STOCKMAN (Brit. Med. Jour., Feb. 27, 1904) states that the term "rheumatic," while still not by any means satisfactorily defined, has gradually become much narrowed from the efforts of many observers to make more accurate diagnoses. Morbus coxæ, coxa vara, Hogarth's nodosities, septic and gonorrheal arthritis are now happily recognized to be separate and distinct from each other and from chronic rheumatism. It is now generally held that chronic rheumatism implicates only the ligaments of the joints and more especially all the fibrous tissues of the muscles and bones. There is still an unfortunate indecision in the matter of its pathology. The essential pathological changes are confined to the white fibrous tissue. Hence the lesion affects the aponeuroses tendons, fibrous septa, sheaths of various structures and the fibrous parts of joints. Microscopically the lesion is seen to consist of a proliferation of fibrous tissue. The part is hyperemic but free from leucocyte engorgement. Frequently this thickening takes the form of a strand or cord running through the part. Sometimes the condition is either duplicated or else closely simulated by the lesion which arises after local injury from strains and sprains. To obtain perfect cure from the recurrent attacks, the fibrous indurations must be disposed of, and in all except the most recent cases, this is a decidedly difficult procedure. Massage and exercise, faradism and the injection of a solution of chromic acid, the latter being applicable only where the areas are sufficiently large, have been found to be most satisfactory. General massage is of no use. The knuckles and fists should be used for rubbing locally. As much as a year may be consumed in disposing of long-standing nodosities. Ten minims or less of a one-per-cent. solution of chromic acid in water may be injected. It may cause pain, but if suitably done, it will ultimately give great relief. There is often occasion to excise the nodes by the knife, and no hesitation should be felt in having recourse to this easy and sensible method.

After-history of Gastric Ulcer.—Seen from a medical or a surgical standpoint, the deductions from histories of these cases are of the utmost importance.

James W. Russell (Lancet, Jan. 30, 1904), who has had a large number of chronic out-patient ulcers under his care for a large number of years, states that as a result of purely medical treatment, his conclusions are as follows: Direct mortality 2.1 per cent., 4.3 per cent. have died from intercurrent disorders, 42.6 per cent. have recovered, 27.7 per cent. having had but a single attack, 14.9 per cent. having recovered after one or more relapses, 44.7 per cent. represented a group in which all the individuals were suffering from stomach symptoms of more or less severity, 14.9 per cent. had very positive attacks with intervals of immunity which apparently resulted directly from the treatment, 29.8 per cent., despite all that could be done, suffered almost continuously from pain. These cases appear to the author to represent those in whom surgical intervention is very clearly indicated.

SURGERY.

Obstruction and Distention as the Cause of Appendicitis.—As the result of experiments on dogs and from the study of cases in man, C. Van Zwalenburg (Jour. Am. Med. Ass'n, March 26, 1904) arrives at the following conclusions: Simple infection does not account for the suddenness of the attack nor early severity of the pathologic changes in acute appendicitis. The evident interference with the blood supply is best accounted for by an increased intra-appendicular pressure. Simply injecting bacteria into the appendix will not produce appendicitis unless used in abnormal amounts and of great virulence. Subperitoneal ligation of the appendix with a simple ligature without distention cannot be made sufficiently permanent to produce a general infection of the appendix, typical of appendicitis in the human being. Experiments in dogs show that hydraulic pressure equal to the arterial tension maintained within the lumen of the appendix for a short time is promptly followed by typical appendicitis. The blood supply in an extremity may be cut off with immunity for hours; but in the appendix the ever-present bacteria at once begin an infection, their entrance into the tissues being facilitated by the opening of normal and traumatic avenues by the very distention which cuts off the circulation. The importance of making a complete diagnosis and prognosis within the first twelve hours of the attack is emphasized. This study suggests the possibility of infections or other lesions being produced in other hollow viscera, especially in the gall-bladder, the stomach and intestines, by temporary overdistention.

Gonococcus Metastasis.—Suppurative lesions occurring in the course of a gonorrhea, other than those in the urethra, in which attempts have been made to demonstrate the gonococcus as the exciting cause, have been made by a number of writers, but the cases are comparatively infrequent. J. McColgan and J. M. Cooper (Jour. Am. Med. Ass'n, April 2, 1904) report an instance where, in a woman of forty years, a sudden attack of what was apparently rheumatism affected the thumb and index finger of one hand. The patient's husband had been under treatment for gonorrhea during the previous month, but no signs of infection could be demonstrated in the wife. No improvement took place and incisions made about a week later into the affected area resulted in the evacuation of a small amount of purulent material. The process extended to the hand and necessitated a freer exposure. The flexor tendon was involved and after healing had taken place, was considerably shortened. No joint anchylosis was present and the authors are inclined to believe that the condition was purely a tendovaginitis. Examination of the pus showed the characteristic organisms of Neisser. Attention is called to the necessity of routine examinations of the pus from such doubtful abscesses, especially those connected with the tendon sheaths. The liability to the transmission of the gonococci to others and the production of a gonorrheal ophthalmia is much more probable than where the disease is localized in the urethra, because in the latter case, definite precautions are usually insisted on. Whether the patient presents the symptoms or not, proper treatment directed to the urethral conditions should be employed in all cases.

Chloroform in Surgical Anesthesia.—A great deal of experimental work has recently been carried on in England bearing upon the administration of chloroform. Dudley W. Buxton (Med. Press, March 23, 1904) gives a further description of the Vernon Harcourt inhaler, which it will be remembered is so constructed as to give exact percentage vapors to the patient. In conclusion he says that the gist of his communication is that a vapor of chloroform not exceeding two per cent. is quite adequate for surgical anesthesia and that its use avoids most of the great dangers of that anesthetic. Such a percentage can be obtained with very great exactness by the use of Harcourt's inhaler. Its technic, which is exacting but not intricate, must be thoroughly mastered in order that the most satisfactory results can be obtained.

Surgical Treatment of Perigastric Adhesions.—It is a favorite belief here that American surgery has surpassed that of the Continent and of England. There is, however, still a good deal to learn from English students concerning the surgery of the stomach. Their journals are filled with the reports of successful cases which have received radical surgical treatment for so-called chronic dyspepsia. E. P. Paton (Lancet, Feb. 6, 1904) says some idea of the frequency with which adhesion about the stomach may be expected is shown by the following post-mortem records: In five per cent. of cases evidence of an active ulcer or of the scar of an old ulcer is present. Fenwick states that in 405 of such ulcers there are adhesions. The situation of these adhesions are as follows: In 143 cases they are between the stomach and the pancreas. In 92 cases to both the liver and the pancreas. In 31 cases the stomach is attached to the colon, liver, spleen and mesentery. Adhesions to the anterior wall are never met with. The history of cases suffering from perigastric adhesions is usually a long and unhappy one. They generally, if carefully traced, are referable back to an old acute attack giving the characteristic sign of ulcer. When these more acute symptoms have passed, the chronic disability shows little tendency to yield to treatment. Pain is not infrequently confined to one location. It is variable in its severity. It is not infrequently uninfluenced by the taking of food. It is frequently much influenced by posture. Exertions are in some cases very likely to bring on pain, sometimes with great suddenness and severity. Local tenderness is very frequent. It may be over the seat of the subjective pain, but not always so. Vomiting does not seem to be very frequent. In those cases in which the gall-bladder and stomach are involved, jaundice may occur. Careful dieting characteristically has no effect upon the pain, and a further point in diagnosis of the condition is that the general health as a rule does not suffer proportionately to the apparent extent of disease. In most cases a tentative diagnosis can be made which will be sufficiently strong to warrant exploratory incision. The treatment consists in the separation or division of the adhesions. This is easy, but the question of preventing their reformation is a very different problem. Exclusion of every element of sepsis is a very important factor. Absence of antiseptic solutions in the abdominal cavity is another. Peritoneal patches over all raw surfaces are of course very much to

be desired. Occasionally sterile oil silk has been used, but it is usually better not to insert foreign bodies into the abdominal cavity. Karl Vogel has shown that none of the membranes and other materials used to prevent peritoneal adhesions have any value, the best results having been obtained by the introduction of large quantities of sterile salt solutions. Promotion of free movement among the viscera by having the patient move from side to side in bed after abdominal section is far more important in the prevention of re-adhesion than any other procedure. The old method of keeping cases of abdominal section too rigidly at rest is probably responsible for many of these adhesions. Forty-two cases are recited in this paper, and the nature of the results are such as to make the most conservative reader agree that no case of chronic dyspepsia should be allowed longer to suffer on.

Surgery of the Prostate.—The immense amount of literature on this subject and the contentions of the espousers of the varied technics show that as yet no definite conclusion as to choice of methods has been reached. THORNLEY STOKER (Brit. Med. Jour., Jan. 30, 1904) deals with the removal of the prostate when the bladder has been opened, with the methods of opening the bladder and treatment of the parts subsequently. He is a champion of the suprapubic operation. When the bladder has been opened, the prostate should be thoroughly examined with the right hand, the left being in the rectum, which has previously been thoroughly cleaned. A pair of blunt end scissors are used to snip through the floors of the bladder and capsule of the gland. This incision should be made over the most projecting part of the larger of the two lobes. The whole gland may be deliverable through the one incision, but if the lobe first incised comes away without its fellow, a second incision should be made. It is well to carry the incision with the scissors well down into the tissue of the prostate. The question of attempting to preserve the prostatic urethra generally settles itself. The urethra may be so glued to the gland that it is torn away with it. Records show that cases do just as well when the urethra has been removed as those in which it has been preserved. As to the nature of prostatic enlargements, the author believes that there are three conditions of senile enlargement: (1) A true hypertrophy of the gland without interstitial growth. (2) The existence upon and within the substance of the prostate of one or more encapsulated tumors distinct from the substance of the gland proper, and either myomatous or adenomatous. (3) A mixed condition of true hypertrophy and interstitial growth of the second class. This condition is much the most common. Gilbert Barling, in the same issue, states that castration as advised by White, which was welcomed with such enthusiasm and vasectomy, which gave promise of equal brilliant results, have both fallen into disrepute in the treatment of prostatic enlargement. The unfortunate fact is, that the diseased enlarged prostate does not diminish as does the normal gland under section of these organs. He advocates Freyer's method of suprapubic prostatectomy. His conclusions are as follows: (1) It is possible to enucleate the prostate; (2) the prostatic urethra is almost invariably, if not always, removed with the organ; (3) if left it will necrose from want of blood supply; (4) stricture does not follow this damage to the urethra; (5) the operation often restores the function of the bladder to an absolutely normal condition. Cuthbert F. Wallace, in same issue, states that an anatomical knowledge of the normal prostate is most essential in these days. The term "fibrous capsule" is used to express the fibrous sheath derived from the rectovesical fascia. There is no capsule in the sense of a separable membrane such as invests the kidney. Nor can the prostate be shelled out of its surroundings like a lymphatic gland or the thyroid. He concludes (1) that the usual form of prostatic enlargement is adenomatous; (2) that this tissue may surround the urethra or form lateral masses or exist in all three parts; (3) that there is always left behind a definite lamented envelope containing glandular tissue derived from the expanded outer portion of the organ; (4) that the amount of envelope left on the surface of the tumor after removal depends on the depth at which the enucleating finger cleaves the envelope; (5) that the rectovesical fascia is not opened nor the plastic plexus of veins injured. (6) He suggests the term surgical capsule for the envelope formed from the prostate by the extension of the adenomata. It is a pathological formation. To its presence is due the small amount of bleeding and the absence of urinary extravasation. In the so-called total prostatectomy, the enucleating finger never passes outside the limits of the prostate, there being always some of this adventitious tissue left behind.

Etiology of Fibrous Orchitis.—Recently the opinion is gaining more and more ground that gonorrhea is an important cause of interstitial orchitis which formerly was looked upon as almost always syphilitic. F. LESSER (Münch. med. Woch., March 22, 1904) detected fibrous changes in 4.5 per cent. of all autopsies on males; in 70 per cent. of these there were other well-marked lesions of syphilis. In another, undoubted specific condition, lobulated liver, syphilis elsewhere was manifest in only 57 per cent., so that it is not wrong to assume that most of the other cases of orchitis were also syphilitic and that gonorrhea really plays a very subsidiary rôle and that the process generally remains restricted to the epididymis. Other unquestionable but rare causes are contusions, mumps, rheumatism, masturbation and bodily exertion.

Veratrum Viride in Surgery.—The physiological action of this drug has been more carefully studied by Dr. H. C. Wood than any other observer, says CHAS. L. BONIFIELD (Am. Jour. of Obst., January, 1904). It relieves inflammatory pain and lowers the temperature. In appendicitis after the principles taught by Ochsner have been applied—that of keeping the stomach and bowels emptied to arrest the peristaltic movements—veratrum viride meets every other indication for treatment. It sustains the heart by making it work easier; it stimulates elimination of the poison by the liver, kidneys and skin; it lowers the temperature and relieves the pain. It is possible that by its action upon the circulatory system brings an army of leucocytes to the field of battle and in this way helps to destroy the invading army of germs. The circulation is much more profoundly influenced by veratrum than by hot and cold applications. In rapid acting hearts in postoperative peritonitis, after the bowels have been emptied, veratrum is a most valuable agent in slowing the heart's action. It is better than digitalis and strychnine, as it lessens the cardiac labor and gives time for rest between beats. Here, too, its eliminative action is most helpful. The preparation of the drug preferred by this author is Norwood's tincture. Where prompt action is wanted, as in eclampsia, it is best to give deep subcutaneous injections. Or, it may be given in this way in appendicitis, if it is desirable to keep the stomach empty. It produces some irritation at the point of injection, though the writer has never seen an abscess. The dose varies from five to thirty minims according to the size and age of the patient. The toxicity of the drug has been overrated by the rank and file of the profession. H. C. Wood says that it is one of the safest of all the cardiac depressants.

THE MEDICAL NEWS.

A WEEKLY JOURNAL

OF MEDICAL SCIENCE.

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SMITH ELY JELLIFFE, A.M., M.D., Ph.D., Editor,
No. 111 FIFTH AVENUE, NEW YORK.

Subscription Price, including postage in U. S. and Canada.

PER ANNUM IN ADVANCE	$4.00
SINGLE COPIES	.10
WITH THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, PER ANNUM	8.00

Subscriptions may begin at any date. The safest mode of remittance is by bank check or postal money order, drawn to the order of the undersigned. When neither is accessible, remittances may be made, at the risk of the publishers, by forwarding in *registered* letters.

LEA BROTHERS & CO.,
No. 111 FIFTH AVENUE (corner of 18th St.), NEW YORK.

SATURDAY, APRIL 30, 1904.

RENAL DECORTICATION VERSUS SECTION.

GUITERAS has recently compiled the results of some 120 cases in which the diagnosis of chronic nephritis were reasonably well established prior to decapsulation. In each one of these patients, the postoperative changes, both from a clinical and pathological standpoint, were watched with extreme care. Looked upon in a light as favorable as might be compatible with accuracy, 16 per cent. of the total number may fairly be considered cured. Forty per cent. were believed to be improved, 11 per cent. were unimproved and in 33 per cent. the operation was followed by early death. Suker reports the histories of 15 patients with albuminuric retinitis, for whom the kidneys were decapsulated. Of these, all save one had died within the two-year limit, and the history of the remaining case was vague.

Walker Hall and G. Herxheimer in the *British Medical Journal*, April 9, 1904, consider that the value of these statistics is minimized by the following considerations:

"First the operation has been necessarily restricted to the latest stages of the disease and has often been performed only as a last hope. Second, the exact stages and extent of chronic nephritis do not permit of accurate diagnosis. Third, chronic nephritis is as a rule characterized by acute exacerbations and frequent remissions. Its anatomical course is in the main a progressive one and the remittent stages often occur under treatment other than that of decapsulation. Of the above 33 per cent. mortality, 26 per cent. died from chronic interstitial nephritis and of the remainder in 25 per cent. death occurred from the so-called chronic parenchymatous nephritis and in 75 per cent. diffuse nephritis was assigned as the cause."

Emerson, Johnson, Claude, Albarran and Bernard are practically unanimous in their belief, which in every case is based upon experimental work, that no new blood vessels of a sufficient size to affect the nutrition of the kidney to any appreciable degree are formed. Enough work has been done on this subject to justify the conclusion that the belief which was originally held both by Edebohls and by others who were early interested in the operation of decapsulation, viz., that the improvement, which often follows its employment, was due to an increased vascularization of the part, is erroneous.

Clinicians, who have observed very marked improvement follow decapsulation in a small but certain number of cases, have been at a loss to understand the cause of the change. It has been claimed rather widely that experimental work on the healthy organ was of no value, first, because the pathological changes, to combat which the operation might be indicated in the human being, were absent in the animal; and second, because of the morphological differences existing between the human kidney and those of the lower vertebrates. The latter objection has not in general been viewed as having much material significance, and an answer to the former is at length at hand.

After creating an artificial nephritis in the kidneys of some fifty-five rabbits, Hall and Herxheimer found practically the same conditions to obtain as was reported in the case of the normal kidneys decapsulated by previous investigators.

Neutral ammonium chromate, the substance originally employed by Burmeister, proved to be the most certain and satisfactory way of inducing the experimental nephritis. From .5 to .75 c.c. of a 2.5 per cent. solution was injected into rabbits weighing from 1,500 to 2,000 grams. This invariably produced an intense acute congestion, followed by degenerative necrosis of the epithelium of the convoluted tubules; by the appearance of quantities of hyaline casts and a variable amount of albumin. Glomerular and interstitial

changes were conspicuously absent both immediately after the injection and for some time thereafter. In the case of those animals who survived twenty days, however, small cell infiltrations were visible around the medium sized blood vessels, indicating that a possible interstitial change was beginning. The effects of the irritant varied in different animals, although an effort was made to obtain a relation between the body weight and the amount of chromate injected. In most cases in which albumin appeared in the proportion of four to one thousand, death subvened in convulsions or in coma within ten days. Concerning hyaline casts in the human urine, it is interesting to note that these were invariably present.

From the anatomical standpoint, decapsulation does not, in the opinion of these authors, offer any advantages. If, as they say, "there exists no anatomical basis for the operation";—increased blood supply to the part—"in acute degenerative nephritis, it is surely impossible that in chronic nephritis the capsular changes will be less marked." This is based on what seems a reasonable belief that the laceration and hemorrhage into the parts would, in the presence of a tendency to sclerotic change, increase the formation of scar tissue.

Have we not at length reached a standpoint from which a different view must be taken of the causes which underlie the unquestionable improvements which do occasionally take place in patients operated upon by this decapsulation method?

For about two years, clinicians and experimental workers have been at variance with each other, the one set of observers claiming that a few cases were unquestionably improved, while the others held that in view of laboratory findings, this improvement was chiefly in the imagination of the operator. The reply of the surgeon to these insinuations was briefly to the effect that in the eyes of the laboratory man, "all cats have nephritis."

Pel, Jaboulay and others have for some time been suggesting that the improvement, evidence of which has been tabulated by Guiteras, arises more from the reaction of the operation upon the sympathetic ganglia, rather than in the increased blood supply to the part. Simple section may therefore give as good results as complicated decortication. This is a new phase of the situation which has much of theoretical and practical interest in it.

THE LAW AND THE CRIMINAL.

THE recent conviction for murder, in this city, of an undoubted victim of sadism, has probably been a source of surprise to not a few medical men particularly to those interested in medico-legal cases. This instance serves to point out a marked deficiency in that important guardian of society, the criminal law. Only too frequently do its dignified interpreters ignore, consciously or unconsciously, the manifold susceptibility of the human mind to loss of equilibrium. To be sure, the opinion of the alienist, as expert testimony, in cases of suspected mental derangement, is given the proper degree of consideration. But the impalpable forms of insanity underlying many offenses against the social order, are rarely recognized by counsel or judge. It is in the imperfect defense and unjust conviction of such cases, that a severe indictment must be brought against the legal fraternity.

It is almost thirty years since Lombroso in his book, "L'Uomo delinquente," gave birth to the modern science of criminology. His views, however, have not yet received universal acceptance. Students of criminality are still arrayed in two opposing camps, the one maintaining that the criminal is born, not made, the other, that he is the product of his environment. From the viewpoint of the biologist it matters little which of these views is the correct one. In each he perceives a moiety of the truth. For is not the animal organism a plastic entity acting upon his surroundings, in turn to be reacted upon by them? It bears the imprint of the past and yields to the molding influences of the present. Heredity has long since been accorded its proper rank among the motive forces of humanity and yet the law will hardly recognize it. To show that the culprit had criminal or degenerate antecedents, is not accepted as a defense. Unless tending to corroborate other direct evidence as to mental disability, such evidence would not be allowed to go to the jury.

"What," it may be asked, "is the cause of this failure of jurisprudence to recognize the biological basis of crime?" In the first place, the modern legal system places an exaggerated value upon the authority of the past and the edifice of the law is largely built upon the practices and precedents of our forefathers. The researches of psychologist and criminologist are given scant courtesy by the learned disciples of Blackstone. In the second place, the education of the legislator and the lawyer is but ill adapted to prepare

a proper soil for the reception of modern scientific thought.

In his "Riddle of the Universe," Ernest Haeckel stigmatizes the august guardians of the law as having "but a superficial acquaintance with that chief and peculiar object of their activity, the human organism, and its most important function, the mind." All that is required of those whose duty it is to shield society from its enemies is a knowledge of human nature and the criminal code. But this is not sufficient. A poor pedagogue indeed would he be whose lore extended little beyond the subject-matter of his instruction and the rules of his school. It is now recognized that the successful instructor must have a thorough grounding in psychology and its parent, physiology. Moreover, in the large cities there is a growing demand for teachers whose knowledge extends into the domain of neuropathology, who have the ability to recognize and deal with defective children and abnormal types. How much more important it is that he who is called upon to judge his fellow-man, should not only possess the trained observation of the psychologist, but should also be familiar with the various clinical forms of mental disease and the extensive literature of criminology. This would be too much to expect of the ordinary lawyer or jurist, for the knowledge required of them in their own technical sphere is sufficiently deep and comprehensive. But is it too much to demand that he who specializes in criminal law and particularly, he who presides over a criminal court, shall have taken his degree in medicine preparatory or subsequent to the prosecution of his legal studies? This would be expecting of the jurist that breadth of perspective and liberality of mind which are indispensable in this enlightened age.

In the Republic of Plato, the rulers of the State are philosophers. Is it altogether Utopian to expect that our modern legislators should possess that illuminating wisdom, which, poised upon the broad basis of a liberal culture, transcends time and place, and scorning the petty considerations of personal gain or ambition, labors for the weal of humanity? Only then will the statutes be framed with a just consideration for the mental and moral delinquents. The spectacle of the State leading to the chamber of execution a trio of brothers in whom the curse of Cain was the culmination of a career of moral deterioration, will no longer offend the eyes of civilization. Let it be demanded, at least, that they who promulgate the laws and they who hold the scales of justice, shall be learned men, scientists, if you will, in touch with the divine harmony of the universe, and not mere "bachelors of law."

NERVE SURGERY FOR THE RELIEF OF PALSIES.

NERVE anastomosis is an important recent development in the surgery of the peripheral nerves for the relief of palsy. Since the work of Faure and Foret in France, and Ballance and Steward in England (1895) a few cases have been from time to time reported. The work, however, received its most decided stimulus in Kennedy's report of a successful case of facio-spinal accessory anastomosis for convulsive tic which was followed by experiments on dogs that cleared up some points in the physiology of restoration of function. Kennedy divided peripheral motor nerves supplying extensor and flexor groups of muscles and sutured the proximal stump of the nerve supplying the extensor group to the distal stump of the nerve supplying the flexor group. A temporary disturbance of motion was soon followed by complete restoration of function. Furthermore the brain centers representing these groups of muscles were found reversed on electrical irritation of the cortex. Through a process of education the cortical centers which represented the extensor and flexor groups of muscles had become reversed. A fact which is still without a comprehensive explanation. While the application of facts derived from experiments on the lower animals cannot always be applied to the human subject without reserve, nevertheless this work of Kennedy's has received important corroboration in the operations recently undertaken for the relief of old facial palsies from mastoiditis or from interstitial neuritis as in Bell's palsy. It has been found that if the distal stump of the facial nerve be engrafted in the proximal stump of a healthy nerve there is more or less shorter restoration of function in the facial distribution. After a longer or shorter period of reeducation the restoration of function is very considerable, which in some instances has been almost complete.

The nerves chosen for anastomosis with the facial were first the spinal accessory, and more recently the hypoglossal. The latter has been chosen by the more recent operators in this country. Frazier, of Philadelphia, reports one case, and Taylor and Clark, of New York, three cases. In all of these cases the report followed too soon after the operation to know the extent of recovery. The consequent paralysis following

division of the hypoglossal and the suture of the proximal stump to the distal stump of the facial contributes one of the chief objections to the operation. This is partially overcome by a side implantation of the facial with only partial division of the hypoglossal, and other similar modifications, but in these instances the results of the operation cannot be expected to be as good as the results following the complete anastomosis. Ballance and Stewart have proven experimentally that to get a more or less complete restoration of function after nerve suture there must be a nice apposition of the sutured ends. Another more or less serious drawback to faciohypoglossal anastomosis is the difficulty of the operation as compared with the faciospinal accessory anastomosis. The latter operation being comparatively simple. We must know the exact results of many operations before we can say which procedure is preferable.

ECHOES AND NEWS.

NEW YORK.

Dr. R. W. Taylor.—Dr. Taylor has removed from his old offices where he has been so many years to 142 West Forty-eighth Street.

The New Bellevue.—Plans for the new Bellevue were exhibited last Saturday at Columbia University, and they promise much for the alleviation of the wretched condition in which New York City now finds herself for adequate hospital accommodation. The buildings may cost the city $10,000,000 before they are finished but no better appropriation could be made to the conservation of the working power of New York City's poor. New York is the largest and most important city of the United States. Its city hospital accommodations are painfully inadequate. The new hospital, if built on the plans submitted, will be not only of great service to the city but will be an ornament as well. Some of the details of the plans will be presented to readers of the MEDICAL NEWS in a subsequent issue.

Hospital Appointments.—The following gentlemen of the College of Physicians and Surgeons secured hospitals during the past week: Rochester City, J. C. O'Connor. St. John's (Yonkers), William Blancard. St. John's (Brooklyn), 1st, R. L. Moorhead. Orange (N. J.) Memorial, Julius Levy. St. Francis, 1st, R. H. Dieffenbach, C. D. Cleghorn, S. W. Wynne, W. H. Whiton. Lincoln, 1st, C. C. Kimball, B. G. Allen, C. W. Woodson. St. Mary's (Brooklyn), 1st, M. T. McSheehy, E. J. Murphy, W. E. McCollum, M.D., 1903. St. Barnabas (Newark, N. J.), G. H. Schenck; Alternate, F. H. Wilson. New York Skin and Cancer, Fred Wise. Almshouse and Workhouse, J. C. Hance, C. H. Weir.

Report of St. Mark's Hospital.—Owing to the great suffering among the poor during the severe winter, St. Mark's Hospital has been taxed to its utmost to give relief to the sick, not only in its wards, but also in its out-patient department. The annual report of the board of managers shows, however, that the hospital has responded as never before in its history to all these demands. During the year ending in March, 4,594 hospital days of treatment were devoted to patients without compensation, while eighty-six days were given to patients who could pay less than a dollar a day. In the out-door department, 2,031 patients made 13,217 visits to the hospital, while 1,660 meals were given to poor persons. In all, 3,344 patients were treated, of whom only 77 died, and 26 of these within three days after admittance to the hospital. During the year, in spite of the additional demands upon the resources of the hospital, the board of managers has paid off one mortgage of $5,000, and reduced another by $2,500. Taking into account all expenditures, the average cost of each patient a day was $1.81.

Church Collection for Hospitals.—Hospitals which receive money from church collections, find their appropriations curtailed this year, because at the last collection the contributions fell off from $83,000 to $75,000. The committee in charge of the fund met in the Mayor's office recently and apportioned it as follows: Montefiore Home and Hospital, $6,400; Mount Sinai Hospital, $4,453; Roosevelt Hospital, $4,216.99; St. Luke's Hospital, $3,758.34; St. Mary's Free Hospital for Children, $3,757.97; German Hospital, $3,159.05; Hospital for the Ruptured and Crippled, $3,154.20; Post-graduate Hospital, $3,133.27; Nursery and Child's Hospital, $3,094.41; Mothers' Home of Misericordia, $2,867.15; Lincoln Hospital and Home, $2,717.70; Infants' Asylum, $1,841.73; Home for Incurables, $1,741.10; Isabella Heimath, $1,754.29; Sloane Maternity Hospital, $1,639.53; French Hospital, $1,530.29; Beth Israel Hospital, $1,417.22; Orthopedic Dispensary and Hospital, $1,401.60; Hospital for the Lying-in Society, $1,399.81; Homeopathic (Flower) Hospital, $1,099.90; St. Mark's Hospital, $960.67; New York Ophthalmic Hospital, $920.66; New York Infirmary for Women and Children, $794.03; New York Eye and Ear Infirmary, $694.16; Babies' Hospital, $667.85; New York Polyclinic Hospital, $663.56; Skin and Cancer Hospital, $653.57; Manhattan Eye and Ear Hospital, $650.52; J. Hood Wright Memorial Hospital, $606.64; Hahnemann Hospital, $526.27; House of the Holy Comforter, $472.26; General Memorial Hospital, $464.33; Lebanon Hospital, $387.81; College and Hospital for Women, $250; Ophthalmic and Aural Institute, $250; St. Andrew's Convalescent Hospital, $250; Convalescent Home, $250. The amount distributed is $64,000, and is known as the "undesignated" fund.

PHILADELPHIA.

Bequests to Charity.—By the will of George Huster, property to the value of $25,000 is bequeathed to various hospitals and homes in this city.

Pasteurized Milk Society.—This institution, which began its work eight months ago by distributing 4,500 bottles of milk monthly, is now giving out 3,000 bottles daily. Six branch stations are now in service and another will probably soon be started in Kensington. The price charged for the milk barely covers the cost of Pasteurization. Contributions since the plant started aggregate $5,500.

Pathological Society.—The annual conversational meeting of the society was held on Thursday evening, April 28. The address was delivered by Dr. M. J. Rosenau, Director of the Hygienic Laboratory of the Marine Hospital Service, the topic selected being "Some Studies in Yellow Fever." Following the address a reception was tendered Dr. Rosenau at the University Club.

Friend's Asylum, Frankford.—The report of this institution for the past year shows that 116 patients

were admitted, 48 of these being men. The total number treated was 265. Several patients were refused admission because of lack of room. A new wing is to be erected at a cost of $20,000; this will furnish thirteen rooms for patients and two sun parlors. Of the 1,738 male patients that have been treated at the institution the largest number of any one class were farmers, 289; of clerks there were 165; merchants, 145; physicians, 46; lawyers, 33. The causes of insanity in the 2,271 patients were, in part, ill health, 420; mental strain, 406; intemperance, 246; domestic trouble, 134; love affairs, 107 women and 28 men.

State Charity Exhibit.—Nearly 1,000 photographs, charts, etc., of the hospitals, asylums, homes, and prisons of Pennsylvania have been shipped to St. Louis for exhibit at the Fair. Among them will be illustrations of the hospitals at the bottom of mine shafts and the Pennsylvania Railroad service with which every engine east of Pittsburg is being equipped. Among the statistics of Pennsylvania for 1904 are: Invested in charitable institutions, $60,000,000; the State is caring for 16,000 people in homes, 30,000 in alsmhouses, and 12,000 in insane asylums. The annual charity expense is $14,000,000.

To Prosecute Unlicensed Physicians.—Recent disclosures by the coroner's office regarding the baby farm traffic in this city have led to concerted efforts to put a stop to this and other illegal medical practice. The County Medical Society has set aside a fund for this purpose and will appoint a committee of three to aid the Coroner, District Attorney and the Director of Public Safety in obtaining evidence against and prosecuting illegal practitioners. It is said that the latter number at least 100 in the city. The *Press* is endeavoring to put in shape a bill that will be introduced at the coming session of the legislature to more closely restrict or make impossible the doings that have been recently unearthed at many of the "farms." To draft the bill there has been formed a committee consisting of Dr. E. E. Montgomery, Dr. J. C. Clark, Dr. Cadwallader, of the Woman's Medical College, G. W. Pepper, representing the Bar, and Miss Richmond, of the Society for Organizing Charity.

CHICAGO.

To Receive Ten Thousand Dollars on Account of Amputation of Frozen Feet and Hands.—It is said that Ellen Robinson, a graduate of the Illinois Training School for Nurses, Class of 1902, now at the Presbyterian Hospital in this city, recovering from the amputation of her hands and feet, will receive from the Alumni of the school a fund of $10,000, to be applied to her support the rest of her life. Miss Robinson, while nursing at Monticello, Ill., this winter, lost her way in a blinding snowstorm, and her hands and feet were so badly frozen that amputation was necessary.

Bazaar to Aid Hospital.—After nine years of work, the people of South Chicago are preparing to establish in the center of that district a permanent home for the South Chicago Hospital of sufficient capacity to meet the demands of that part of the city. With that object in view, the directors of the only institution of that kind located in South Chicago district announce a two weeks' bazaar for the purpose of starting a permanent hospital fund. It is intended to replace the present small and inadequate institution with a hospital building involving the expenditure of $100,000.

Osteomalacia.—Dr. Thomas A. Davis read a paper on this subject before the March meeting of the Chicago Surgical Society, and reported a case. The author believes that this is the first case that has been demonstrated in North America in a male, with apparent arrest of the disease, reported one and one-half years after operation. The patient was a Norwegian, aged thirty-three years. The family history, previous history, present illness, exploration of fracture, pathological fracture, diagnosis, differential diagnosis, etc., were gone into extensively by the essayist, also the treatment, subsequent history, and skiagrams of the case were exhibited. Retrospectively, taking the symptomatology as completely evolved in this case, the author said the simplicity of diagnosis was quite apparent. With but a slight knowledge of the disease, the inference could scarcely be incorrect. But taken at such a time as that previous to operation, the diagnosis was not so easy. These were the objective symptoms: Shortening of stature, curvature of the spine, barrel-shaped chest, none of which had been noticed by the patient. The subjective symptoms were rheumatoid pains in the extremities and spine, with possible mental manifestations of stupidity, and a mild degree of melancholia and myasthenia. As to the objective symptoms, one commonly meets with them among laboring people, without attempting to determine the cause as to rickets or occupation, etc. There was nothing characteristic about the pains complained of, and it is yet questionable as to the mental disturbance. It is quite clear that there is no individual pathognomonic symptom of osteomalacia, and still authors have expressed astonishment at the late date of recognition, or complete failure to diagnose the disease. At the present time, with no knowledge of the cause of the disease, its real nature cannot be recognized until advanced bone changes have taken place. In reviewing the history of a large number of cases, the author finds that the symptoms almost universally mentioned are rheumatoid pains in the extremities and spine, without swelling, accompanied by myasthenia, these symptoms preceding for some months deformity and fracture. With the history of such symptoms, the X-ray should show the lessened density of the bones, and serve to establish a diagnosis. Dr. D. J. Davis presented an extensive pathological report of this case. He gave a brief résumé of the theories advanced to explain osteomalacia, none of which he said is satisfactory. It is quite likely that softening of bones is produced in a variety of ways, and that different forms probably require entirely different explanations.

Extirpation of Suppurating Kidney.—Dr. Frederic A. Besley read a paper on this subject before the same society, and presented a case. Ether was the anesthetic used, and the organ was removed through a lumbar incision. The patient made a perfect recovery. He said a retrospective view of the case presented one important question, namely, Was the removal of the kidney the wisest procedure, or would it have been better surgery to have made an effort to restore the patency of the ureter and preserve the organ? In this particular case he did not think he was justified in jeopardizing the patient's life by exposing him to a prolonged operation and a prolonged convalescence.

GENERAL.

A Dispensary for Paterson, N. J.—That the city of Paterson is to have a dispensary of its own was decided April 21, at a meeting of the Charities and Correction Committee of the Board of Aldermen. The clerk of the board was instructed to solicit bids for drugs on a schedule submitted by City Physi-

cian Van Noort which would supply sufficient to run the dispensary for about three months. Dr. Van Noort said that he had received the dispensary outfit belonging to the late Dr. Myers, the gift of his brother, George A. Myers, and that it would require few additions. A prescription clerk will be engaged by the city for about three hours a day at a salary of about $25 a month, and it is expected that the new plan will result in a reduction of expenses.

Addition to Harvard Medical School's Infirmary.—The work of constructing the contagious ward of the Stillman Infirmary at Harvard is to begin soon, and it is hoped to have it completed by next fall. The recent gift of $25,000 from Mr. Stillman, added to his previous gift of $50,000, has made it possible to carry out the project in a manner completely satisfactory to the college authorities. The new building is to be of the same style architecturally as the infirmary, and is to be connected with it by a semicircular passageway of two stories, the lower of masonry and the upper an open colonnade. In dimensions the new building will nearly equal the present building, being about 80x40 feet, and four stories high.

The Tri-State Medical Society of Iowa, Illinois and Missouri.—This society will meet in St. Louis, June 15, 16 and 17. An interesting program is being prepared, and some of the most distinguished physicians and surgeons of the country will attend the meeting. The president is Dr. W. B. La Force, Ottumwa, Iowa; and Dr. Louis E. Schmidt, 1003 Schiller Building, Chicago, is the secretary. Dr. James Moores Ball, 3509 Franklin Avenue, St. Louis, is Chairman of the Committee of Arrangements.

American Climatological Association.—The Committee on Nomenclature of this association suggests the following classification for cases of pulmonary tuberculosis: *Incipient.*—Slight physical and subjective signs, with history indicative of pulmonary tuberculosis. Sputa, if present without bacilli; *First Stage.*—Definite physical signs of localized infiltration; total involvement less than half a lobe, whether at one or more points; cough and expectoration with bacilli; constitutional symptoms, slight. (In disseminated cases expectoration and bacilli may be absent with constitutional symptoms more severe.) *Second Stage.*—Infiltration of single or multiple areas approaching or equal in amount to one lobe; or smaller area in stage of softening; cough and expectoration with bacilli; constitutional symptoms, severe. *Third Stage.*—Infiltration in excess of one lobe or if less in stage of well developed excavation; more severe constitutional symptoms. They also suggest a classification of results of treatment as follows: *Progressive.*—All essential symptoms and signs continue unabated. *Quiescent.*—Constitutional symptoms slight or entirely absent; physical signs improved or unchanged; cough and expectoration with bacilli still present. *Arrested.*—Absence of all constitutional symptoms; expectoration and bacilli still present; physical signs may or may not persist; foregoing to have existed for at least three months. *Apparently Cured.*—All constitutional symptoms and expectoration with bacilli absent for a period of three months. *Cured.*—All constitutional symptoms and expectoration with bacilli absent for a period of two years under ordinary conditions of life.

American Climatological Association.—The twenty-first annual meeting of the Association will be held in the banquet room of the Aldine Hotel, Chestnut Street, above Nineteenth, Philadelphia, on June 2, 3, and 4, 1904. The following program has been arranged: President's Address, by Dr. J. C. Wilson, Philadelphia; Climatology as a Study in Medical Schools, by Dr. S. E. Solly, Colorado Springs; The Climate of Santa Barbara, California, by Dr. W. H. Flint, Santa Barbara; The Climatology of Muskoka, Ontario, Canada, by Dr. J. H. Elliott, Gravenhurst, Ont.; Weather Observations in the Adirondack Mountains, by Dr. Lawrason Brown, Saranac Lake, N. Y.; Some Meteorological Comparisons of the Winter of 1903-4, by Dr. Carroll E. Edson, Denver, Col.; The Climates and Diseases of Central America and Panama, by Dr. J. Edward Stubbert, New York City; Ocean Bathing, by Dr. Philip Marvel, Atlantic City, N. J.; A Study of the Delirium Accompanying Heart Disease, by Dr. R. G. Curtin, Philadelphia; Phases of Arterial Sclerosis or Painful Cardiac Affection, by Dr. Judson Daland, Philadelphia; The Mechanical Treatment of Organic Heart Disease, by Dr. Charles E. Quimby, New York; Effect of Altitude upon Blood Pressure, by Drs. C. F. Gardiner and Henry W. Hoagland, Colorado Springs; A Study of Infection in Pulmonary Tuberculosis, by Dr. F. M. Pottenger, Los Angeles; What Shall We Do with Our Tuberculous Patients? by Dr. F. I. Knight, Boston; Some Cases of Pus Infection Simulating Pulmonary Tuberculosis, by Dr. Robert H. Babcock, Chicago; Pulmonary Tuberculosis in Children, by Dr. William Duffield, Phœnix, Arizona; Tuberculosis in Children, by Dr. Thomas Darlington, New York City; The Use of the Fluoroscope as an Aid in the Physical Diagnosis of Pulmonary Tuberculosis; its Limitations and Its Advantages, Based on Three Years' Experience, by Dr. Charles L. Minor, Asheville; Recent American Contributions to the Methods of Prevention and Treatment of Pulmonary Tuberculosis: (1) Antituberculosis Societies and Their Work, (2) Exposition in Baltimore, (3) Facilities for Out-door Treatment, (4) New Sanatoria, by Dr. A. C. Klebs, Chicago; A Plea for the Revision of Terms Used in Physical Examination of the Lungs, by Dr. J. Hilgard Tyndale, Lincoln, Neb.; The Pitch of the Normal Pulmonary Valve Sound, and the Practical Significance of Its Changes in Acute Lobar Pneumonia and in Emphysema of the Lungs, by Dr. Howard S. Anders, Philadelphia; Meteorologic Conditions in the Causation of Lobar Pneumonia, by Dr. James M. Anders, Philadelphia; Some Unsettled and Important Problems in the Treatment of Acute Lobar Pneumonia, by Dr. Beverley Robinson, New York City.

Association of American Physicians.—The nineteenth annual meeting will be held in the New Willard Hotel, Washington, D. C., May 10 and 11, 1904. The following program is announced: The President's Address, by Wm. T. Councilman, Boston; General Business; The Influence of Supra-Renal Extract upon Absorption and Elimination, with Demonstrations, by S. J. Meltzer and John Auer, New York; Polyuria in Typhoid Fever, by M. H. Fussel, H. S. Carmany and H. Hudson, Phila.; Polyuria in Typhoid Fever, by James C. Wilson, Philadelphia; Cases of Venous Thrombosis Occurring in the Course of Typhoid Fever, by W. S. Thayer, Baltimore; Clinical Studies in Arteriosclerosis, by Alfred Stengel, Philadelphia; An Investigation of the Effects of Cardiac Stimulants, Especially Strychnine, on the Blood Pressure in Febrile Conditions, by R. C. Cabot, Boston; A Supposed Cause of High Tension Pulse in Nephritis, by W. H. Thomson, New York; Poisoning by Illuminating Gas—A Clinical Study of Fifty Cases, by W. G. Thompson, New York; Nephrectomy for Renal Tuberculosis, by I. N. Danforth, Ann Arbor; Abdominal Pain from Unsuspected Irritation of the Internal Inguinal Ring,

by Chas. G. Stockton, Buffalo; The Mechanism of Exophthalmos, by W. G. MacCallum and W. B. Cornell, Baltimore; Diabetes Insipidus, by Thos. B. Futcher, Baltimore; A Case of Prolonged Male Hysteria with Autopsy, by S. Weir Mitchell and Wm. G. Spiller, Philadelphia; Some Unusual Forms of Acute Myelitis, by B. Sachs, New York; Infectious Neuritis with Report of Cases, by Jas. J. Putnam, Boston; The Clinical Features, Prognosis, and Treatment of Cerebrospinal Meningitis in Infants and Children, by Henry Koplik, New York; A Case of Spasmodic Stricture of the Esophagus with Sacculation, Treated by Dilatation, and Later, by Gastrotomy, by James Tyson, Edward Martin and Thos. Evans, Philadelphia; Idiopathic Dilatation of the Esophagus—Cardiospasm, by B. W. Sippy, Chicago; Annual Dinner at the Willard Hotel; A Lantern Slide Demonstration of the Protozoon-like Bodies Found in Scarlet Fever, by F. A. Mallory, Boston; A Lantern Slide Demonstration of Trypanosomes, by Chas. S. Bond, Richmond, Ind.; Election of Members; The Relation of Cells with Eosinophile Granulation to Bacterial Infection, by E. L. Opie, Baltimore; A New Case of Chloroma with Leucemia, with a Study of the Cases Reported since 1893, by Geo. Dock and A. S. Warthin, Ann Arbor; The Neoplasm Theory of Leukemia, with Report of a Case Supporting This View, by A. S. Warthin, Ann Arbor; Types of Splenic Anemia or Splenomegaly, by Alfred Stengel, Philadelphia; On the Cultivation of *Trypanosoma Evansi*, by F. G. Novy, W. J. McNeal and C. B. Hare, Ann Arbor; The Agglutination and Filtration of Trypanosomes, by F. G. Novy and W. J. McNeal, Ann Arbor; Zonal Necrosis of the Liver, by E. L. Opie, Baltimore; Attempts to Produce Liver Necrosis by Venous Injections of Intracellular Bacterial Toxins, by R. M. Pearce and C. K. Winne, Jr., Albany; Exhibition of Specimens of a Malignant Adenoma of the Liver, by Geo. L. Peabody, New York; Rhythmic Lateral Displacement of the Heart as a Sign of Unilateral Pleuritic Exudate, by Chas. L. Greene, St. Paul; Pneumopericardium, with Report of a Case, by W. B. James, New York; Three Cases of Probable Psittacosis, by H. F. Vickery, Boston; Addison's Disease with and without Adrenal Tuberculosis, by C. F. Withington, Boston; Report of a Case of Acromegaly, by Chas. L. Greene, St. Paul; A Study of the Tubercle Bacilli Isolated from Three Cases of Tuberculosis of the Mesenteric Lymph Nodes, by Theobald Smith, Boston; Studies on the Etiology of Variola with Demonstration of Microscopic Preparations, by Wm. T. Howard, Jr., and Roger C. Perkins, Cleveland; Chronic Thrombosis of the Pulmonary Arteries in a Case of Multiple Serosities, Simulating Aneurism of the Thoracic Aorta, by E. F. Cushing, Cleveland; Pneumococcic Arthritis, by S. Solis Cohen, Philadelphia; Pulmonary Actinomycosis, with Report of a Case, by S. Solis Cohen, Philadelphia; Election of Officers and Concluding Business.

"Tonnage" in the Medical Profession.—An editorial in the May *Scribner's* takes for its theme the ideal of an executive in a large metal-refining concern, viz., "tonnage" and its writer applies the statement to the professions, especially that of medicine. He goes on to say, "It is the opinion of one of the oldest medical instructors in our country that the schools of to-day aim to turn out more graduates and better students of medicine than ever before, and that they succeed, but do not turn out as good doctors, on the average, as they did forty years ago." The reporter does not know when or by whom this assertion is made, hence he can have no idea as to the weight of authority back of it. Granting the right of free thought and open expression of opinion, and realizing how much the question of medical education has occupied the attention of those most fitted to speak during the past year or two, one can concede that the above-mentioned "instructor" may be right. At the same time, however, one may assume that he is wrong and base the defense of his propositions upon the results that are being achieved by the more recent graduates. Of course, more graduates and better students do not make up the large percentage of good doctors; for the rightful application of that term recognizes the varied and almost indescribable qualities which such must possess. It is certainly a good thing to have at one's finger tips the theory of medicine, but it is also quite another thing to put those theories into practice; in other words, to be resourceful. Perhaps the apparent difference between the men of to-day and of forty years ago who have gone out to practice medicine is due to the tendency everywhere so manifest to migrate from the country into the city. Forty years since there were fewer and smalled cities and comparatively few doctors ever thought of settling down in a town numbering over five thousand inhabitants. Country doctors are essentially self-reliant, and perhaps that is what was meant by the term "good doctor." There must be all sorts and conditions of men in medicine as elsewhere and it is quite natural that the college-bred and thoroughly equipped young doctor should choose for himself a field in which he might reap the cost of his education as soon as possible, leaving for his less trained though perhaps thoroughly efficient classmate the sparsely settled districts. Speaking of the physician of to-day, the article says: "What he bemoans to-day is the intense prevailing desire for organization. He says that the schools are becoming teaching shops and the instructors teaching machines. The large number of students forces the subdivision and specializing of instruction, and each specialist seeks naturally to magnify his office. The student is passed successively or simultaneously through a certain number of courses which are more and more 'thorough,' but often leave him with an inadequate knowledge of the general facts and principles of his profession. In science as in the social order 'time makes ancient good uncouth.' The proportion of 'good doctors' in the multitude issuing from the modern schools is probably as great as the old schools turned out; the positive number of the less competent is necessarily larger. But the least fitted of these will not do the harm in some ways that the best-trained often, in good faith and ignorance, were wont to do. The 'tonnage' of the profession seems portentiously large, but the one principle that we may be confident works now as surely as it ever did, is the survival of the fittest." Perhaps the "tonnage" is larger than necessary. There are equally good arguments for and against this view, but it seems to the writer that one need scarcely worry about an overproduction of physicians; for in our profession as in every other the law of supply and demand is constant and either factor will adjust itself to keep as nearly perfect a balance as is possible if one can only afford to be patient.

OBITUARY.

Dr. LORENZO J. KOHNSTAMM, of New York, forty-four years old, died on Monday last.

Dr. WILBUR F. NUTTEN, one of the best known medical practitioners of Western New York, is dead at his home in Newark, N. Y., from heart disease,

at the age of sixty-four years. He was a graduate of the College of Physicians and Surgeons of New York.

Dr. EDWARD HENRY LEE, of Chicago, was almost instantly killed last Sunday morning. Dr. Lee was educated in Heidelberg and Vienna. He was also a student at Bonn University and later studied medicine at Würzburg University. He was a surgeon at the Alexian Brother, West Side and Cook County hospitals.

CORRESPONDENCE.

OUR BERLIN LETTER.

BERLIN, April 1.

ARRIVAL OF ANGLO-AMERICANS FROM VIENNA—RELATIVE MERITS OF BERLIN AND VIENNA POST-GRADUATE WORK—PROF. ORTH'S ANSWER TO VON BEHRING ON THE QUESTION OF TUBERCULOSIS—THE ANGLO-AMERICAN CLUB—SUCCESSFUL INOCULATION OF SYPHILIS ON ANIMALS OTHER THAN HUMAN BEINGS—PROGRESSIVE METHODS OF THE GERMANS AS REGARDS HOSPITAL CONSTRUCTION.

OWING to the Easter holidays and the coming medical congress in Leipzig the present month will be very quiet, medically speaking. The University is entirely closed, and not only are the large and more important of the University clinics and courses not given, but even the majority of the minor courses, so that it is rather difficult to obtain the work one desires. During the past week there have been a large number of arrivals of Anglo-Americans from Vienna, where the same condition of affairs is present, and which evidently prompted the present pilgrimage to Berlin. Unfortunately, however, they are finding themselves disappointed and many are already wishing themselves back.

With this commingling of students from the great centers of medical learning there has naturally been considerable discussion of the oft mooted question as to the relative merits of Berlin and Vienna as regards post-graduate work. It has always been a matter of the keenest moment to Americans, and is unquestionably the first decision that confronts him when he thinks of studying abroad. There are a large number of Americans in Berlin at present who have been to both places and who are therefore competent to judge, and I have tried to obtain some sort of general consensus of views upon this subject. Like most questions of this nature it seems to be an entirely relative matter. You will find some men condemning the work in some particular branch, while others regard it in the highest esteem, and altogether the opinions are so diverse and varied that it is hard to form them into a good general classification. It seems to be not only a question of the particular line of work sought for, but also, and to a large extent, on the individual temperament and the student's previous training. There are many who will be very well satisfied with a particular course, but which will be regarded as highly unsatisfactory by a more advanced student; and on the other hand there will be a large difference of opinion by two men of equal capabilities otherwise, which depend upon nothing but obscure and subtle differences in individual taste. Judging from the standpoint of choice of subject, however, the consensus of opinion seems to be that in pathology, skin, and diseases of the stomach, and nervous system the opportunities in Berlin are far better than those in Vienna, whereas, on the other hand, Berlin is no match for Vienna in internal medicine, where the keener and more profound methods of the Vienna School come into play. In surgery, bacteriology, children's, ear, laryngological and genito-urinary diseases, the two cities are about equal. These distinctions, however, should not in any way be understood to be hard and fast, because, for instance you can undoubtedly get excellent courses in pathology in Vienna, and on the other hand, some of the internal medical work in Berlin will prove very satisfactory. They only intend to express a general average, and if one intends to get the most of his time in the course of his work in Europe, it will pay him best by going to both places and absorb the best essences from both.

Virchow has not been dead qüite two years and although it cannot be said that he is sadly missed, nevertheless you hear every once in a while expressions of fond remembrance which the present régime will probably not recall. Nobody denies that his successor, Orth, is a very competent man and probably the best pathologist in Europe; nevertheless the difference between the personalities of "The Founder of Modern Pathology" and his successor is striking. Virchow was a genial old soul and bore himself with a quiet dignity that is in strong contrast to the gruff, abrupt and distant nature of Orth. There was an intimacy between master and pupil in Virchow's time that makes the deadly fear in which the assistants regard their chief at the present time quite amusing. It is evident that he is ruling things with an iron hand and gives very little opportunity for the play of any sentiment. Even the medical fraternity of Berlin have a wholesome fear of the pathologist, for they regard him as a deadly antagonist in debate. It is conceded by all that he is one of the best masters of medical polemics that Berlin has seen, and his answer to von Behring some weeks ago at the "Gesellschaft" on the question of tuberculosis, is still being spoken of as one of the masterpieces of medical debate. Backed by his enormous knowledge and his keen critical insight, combined with a clear diction and forceful delivery, he is an unmerciful antagonist and woe to him who meets his ire. Curiously enough, the only man in Berlin who has the happy distinction of being in any way a rival of Orth is a "horse-doctor," the pathologist of the veterinary school, a man of most profound learning and an excellent debater.

The Anglo-American Club is still in existence, and what is more, prospering far beyond the expectations of its founders. The general plan of the meetings has been changed from those heretofore, and instead of hearing papers written by the members, there is an invited guest at each meeting, some distinguished medical man from Berlin, who holds a "Vortrag" on some topic of general interest. It was found that interest in the society slackened under the original scheme, whereas at present the weekly meetings are looked forward to. It is not difficult, as was originally thought, to get the highest "talent" to come, and nobody who has been invited has yet refused the invitation. Thus far some of the most distinguished personages in Berlin have been present, among whom may be mentioned, Ewald, Olshausen, Grawitz, Israel, Wasserman, Peck, etc. We have been very fortunate also in having the opportunity to hear two of our best known Americans as well: Prof. Scripture, of Yale, and Prof. Simon Flexner, Director of the Rockefeller Institute. Prof. Scripture gave a most interesting and fascinating demonstration and lecture on "Experimental Phonetics." The night of his lecture was made into a kind of gala occasion, and the club invited many distinguished laymen, among whom may be mentioned the Consul-General of Berlin, Mr. Mason, and some professors from the Academie and medical university. Prof. Flexner, who incidentally is working in Prof. Salkowski's laboratory, lectured on the "Etiology and Treatment of Dysentery" and gave an excellent résumé of the im-

portant work done by himself and his coworkers on this subject. He was elected subsequently as the first honorary member of the Anglo-American Medical Club of Berlin. At the last meeting the surgeon Israel spoke on the "Surgical Treatment of Nephritis." The best part of the lecture dealt with an analysis of Edebohls' work and his statistics. He tried to show that even according to Edebohls' own published records the latter had failed to cure one case of chronic Bright's Disease, and he claims that the reported cures are simply those where the nephritis was combined with a movable kidney. He also reported six cases of his own with one death and no cures.

Up to the present the inoculation of syphilis on animals other than human beings has been entirely futile. It may be of interest to know that this has finally been accomplished by Lassar, who announced some weeks ago at the Berliner medicinische Gesellschaft the successful inoculation of a chimpanzee. After the regular period of incubation, typical lesions presented themselves, which were confirmed by microscopical examination. Since then he has successfully inoculated another chimpanzee, and the dead specimen was presented at the society two weeks ago. It showed typical macules and papules and other undoubted specific lesions all over the body and especially on the soles and feet.

The progressive methods of the Germans as regards hospital construction is again exemplified in the new Charlottenburg Krankenhaus which is rapidly nearing completion and which will be opened very shortly. Prof. Grawitz conducted a party of American students through the different buildings a number of weeks ago. It is built on the most elevated part of Charlottenburg, affording a delightful view of the surrounding country. It is constructed on the pavilion system, the separate buildings being connected by corridors and naturally with the aid of the most modern methods of hospital construction. The whole covers an extensive plot of ground and will have a capacity of about 800 beds.

THE CORONER'S BILL.

To the Editor of the Medical News.

Dear Sir: The so-called Coroner's Bill has passed the legislature and is now before the Mayor of Greater New York for his signature. If the physicians of Greater New York would write a personal letter to the Mayor in favor of Senator Elsberg's Coroner's Bill it would greatly help the Committee on Legislation to place this important bill upon the statute books of this State.

This bill had its origin in the New York County Medical Association, which has agitated the subject independently and in association with other medical bodies in Greater New York for many years, and finally a joint committee, representing the counties of New York and Kings, of which Prof. Stephen Smith, M.D., was chairman, and with the aid of Mr. James Taylor Lewis, Counselor of the New York State Medical Association prepared the draft of a bill which with some modification is the bill introduced in the legislature by Senator Elsberg. The Committee examined the system of verifying deaths in Massachusetts and many other States and foreign countries and concluded to recommend that the office of Coroner with its jury in Greater New York be abolished and the duties connected therewith be transferred to already existing departments of the city government, namely, judicial duties to the city magistrates, the medical duties to the Department of Health, the civil duties to the City Chamberlain and the legal duties to the District Attorney.

The office of Coroner in the City of New York is the butt of the paragrapher, the subject of ridicule by the press and is little respected by the community at large and the reason therefor seems to me to be in the fact that the Coroner exercises with his jury extraordinary authority and fills many offices so that there is no man to be found to-day with such power of mind and versatility of talent who can as Coroner sit upon the bench as a judge, deciding the kind of evidence which shall be submitted to his jury, who leaves the bench to go to any place to take the ante-mortem statement of some poor injured mortal, and, in case of death, to decide its cause, incorporating in his decision the latest researches in chemistry, biology and pathology and yet only one of the eleven Coroners of the City of New York is a lawyer.

The Coroner adds another terror to sudden death in the City of New York, for if he suspects suicide then Section 775 of the Code of Criminal Procedure commands that his jury must be present while the inspection of the body is being made. The Coroner is higher than the sheriff and replevins merchandise from him in civil suits. The Coroner's system in the City of New York is a relic of bygone ages and has outlived its usefulness. In analyzing the so-called Coroner's Bill we can understand how the several existing departments of the city government can do with a great saving of the city's money the work of the Coroner's office much more satisfactorily than it has been done heretofore. The bill transfers the judicial functions of the office of Coroner to the present city magistrates, whose duties are not mixed but essentially those of judges, and the legal duties attending the inquest will be conducted by the District Attorney, in a magistrate's court, and will have the character and dignity which befits proceedings always of a solemn import to parties immediately concerned and often of far-reaching influence upon the welfare of the community in which the suspected crime was committed. The civil duties, such as replevining merchandise from the sheriff, are transferred by the proposed bill to the City Chamberlain, an officer of the city government who is in every way qualified for the responsibility imposed upon him. The medical duties are transferred to a bureau to be created in the Department of Health, with medical examiners who will act under a chief who shall be a skilled and practical pathologist and who shall have practised his profession in this State for five years and at least three of which shall have been spent in laboratory work in pathology and bacteriology. The Department of Health will assume all of the duties connected with investigating the cause of death, bringing to its aid well-equipped chemical and biological laboratories, conducted by expert scientists. The researches in these laboratories have received honorable mention in the great medical congresses of the world and the practical results have stimulated other cities to copy its admirable work. And it now remains for the Mayor and the Governor to give the City of New York the much-needed relief from its inadequate Coroner's system.

Yours very truly,

E. Eliot Harris,

Chairman, Committee on Legislation.

An Improvement on the Air-cushion in Surgery.—It is so important to get a good view of the field of work that any method which serves to aid in bringing the posterior portion of the retro-abdominal wall nearer to the surface is of value. Here we use, especially for operations on the kidney, various forms of cushions. G. Kelling (Zntrlbl. f. Chir., Jan. 30, 1904) illustrates an admirable addition to the ordinary operating table. It consists simply of a cross-bar which passes beneath the midtrunk region.

SPECIAL ARTICLE.

PHYSICAL CHEMISTRY VERSUS BIOLOGY IN THE DOCTRINES OF IMMUNITY.*

BY PROFESSOR PAUL EHRLICH, M.D., LL.D.,
OF FRANKFORT-A.-M., GERMANY.

PROF. EHRLICH devoted himself mainly in this lecture to a discussion, polemical in character, of the physicochemical investigations of Arrhenius and Madsen, the Danish physicists. They applied the methods of physical chemistry to the study of toxins and antitoxins and one of their beliefs is, that tetanolysin is a uniform substance possessing only a weak affinity to its antitoxin and that its neutralization occurs in accordance with the law of Guldberg and Waage. His own doctrine of the pleurality of toxic constituents was discussed in connection with the assertions of these observers and then he alluded to the fact that their views only met with a favorable reception in certain scientific circles which lacked special competence in serotherapeutical questions. Ehrlich protested against the attempts of these authors to claim exclusive priority in the development of these questions, for the method of partial neutralization of toxins followed by them was opened and developed by himself. Equally unwarranted is the reproach that his (Ehrlich's) investigations are inaccurate and have been conducted without sufficient regard for possible sources of error. His most important results have been confirmed by A. and M., especially as regards the existence of toxoids and their occurrence with varying degrees of avidity. Neither will he admit that he has used the simplest possible explanations although he always began with the simplest, and as in the case of diphtheria toxin, substituted more complex ones only when the experimental results made this necessary. The contention, moreover, that his investigations represent merely an application of Thomson's principles in his studies of affinities between strong acids and bases is incorrect, because the latter worked with material substances only.

Ehrlich next took up the points of departure between his methods and those of other investigators. In the first place it was to be determined whether in the production of toxoids a change in avidity for antitoxin occurred. The only available method for this was that of partial saturation or neutralization, which was defined in detail. If the toxin were a single substance of uniform composition and the antitoxin possessed for it a strong affinity, like that between hydrochloric acid and potassium, the quantities of toxin which disappear or are neutralized in these mixtures, would be in direct ratio to the quantity of added antitoxin. In fact the process of neutralization takes place in a different manner which was illustrated by a series of diagrams, in which the experimental results were presented in graphic form. The first, designated by Ehrlich as the spectral mode of representation, shows step by step the extent of diminution in the number of toxic doses effected by a definite small quantity of antitoxin. Another method, the "linear," employed by Arrhenius, is mathematical in character, and in it the quantities of antitoxin added are represented on the abscissa and those of the active toxic doses present on the ordinates. Ehrlich does not consider that this method has any advantage over the former and is objectionable because the graphic line corresponds only in its middle part with the values actually found, and toward the beginning and ends shows considerable deviation.

The interpretation of the phenomena of neutralization was next considered and it was shown that three different zones can be distinguished in the spectral mode of representation. In the first zone one combining unit of antitoxin removes on the average either one-half or one entire lethal dose. As there is reason to assume that in the case of an ideal, absolutely pure toxin one combining unit removes exactly one lethal dose, the foregoing result indicates that in this zone pure toxoid, or pure toxin, or a mixture of equal parts of toxin and toxoid, designated by Ehrlich as hemitoxin, is neutralized. The existence of hemitoxin is possible only in case the toxoid has precisely the same avidity as the toxin, and from this it follows that, as assumed from the beginning and moreover confirmed by Arrhenius, in the transformation of toxin into toxoid, no change in avidity occurs. Pure toxoid occurs often in the form of a prototoxoid, which possesses a stronger avidity for antitoxin than all other components of the toxin and thus manifests its presence that to the solution of toxin containing it a certain quantity of antitoxin can be added without lessening in the slightest degree the toxicity. The existence of prototoxoids is denied by Arrhenius, but the criticism is not applicable because the substance has been repeatedly tested and prototoxoids have also been positively demonstrated in the case of other poisons and analogous substances, ferments and agglutinins.

The second zone in the spectrum is of relatively short extent and is characterized by the fact that one combining unit removes only a fraction of the lethal dose. This is the zone of decisive significance for the hypothesis advanced by Arrhenius. The third zone is called by Ehrlich the toxone zone. The toxone is one of the primary products of secretion of the diphtheria bacillus, possessing the same haptophore group as the toxin, but of far less avidity, and entering in the process of partial neutralization therefore last into combination with antitoxin. Its toxophore group differs from that of toxin, being incapable of producing acute effects, such as cutaneous necrosis and death. Toxone is responsible for the diphtheritic paralysis occurring in guinea-pigs between fourteen and thirty days.

An extended discussion then followed in which Ehrlich attempted to refute the objections advanced by the physicochemical school against his theories. Arrhenius concluded from his experiments in neutralization of ammonia by boric acid, that inasmuch as the neutralization of tetanus-toxin proceeds in the same way it is superfluous to assume the existence of different components and sufficient to assume a single uniform toxin with weak affinity for its antitoxin. In reply Ehrlich stated that at the outset of his investigations he was led to assume a strong affinity between toxin and antitoxin. This opinion was supported by the experiments of Dönitz and Heymann, who demonstrated the extraordinary rapidity with which diphtheria toxin introduced into the circulation combines with the toxophile receptors in the tissues. It must therefore possess a high degree of avidity. The protective and curative properties of the serum indicate that the antitoxins possess at least as strong an avidity as the tissue receptors. Furthermore the therapeutic experiments of Dönitz in animals and of Madsen on red cells prove that the antitoxin when once bound, becomes so firmly fixed that the specific serum fails after a time to produce any curative effect. This indicates that after fixation of the toxin, secondary chemical modifications transform the primary labile combination into a stable one. Ehrlich was finally able to show that toxin and antitoxin unite with great avidity, and that certain variations which occur with different specimens of toxins could be referred to the presence of toxone.

The evidence which Arrhenius advanced to account for the assumption that toxin and antitoxin are actually

* Second Herter Lecture, delivered at Johns Hopkins University, Medical Department, April 13, 1904.

substances of weak avidity, was then discussed. He commented on the fact that biological data which speak against this view are either entirely ignored or set aside under arbitrary assumptions of an inexact investigation. The sole support advanced is the tetanus curve. The entire calculations of these authors proceed from the assumption that neutralization of toxin and antitoxin is an interchangeable or reversible reaction. If it can be shown that the process is not a reversible one, then the basis is withdrawn from all the reckonings and deductions of Arrhenius. No experiments have been made on this point by Arrhenius himself, but v. Dungern has taken up the subject by applying the procedure used by Danysz for other purposes, of successive additions of toxin to antitoxin. The conclusions to be derived from these experiments are that the union of diphtheria toxin and antitoxin does not proceed in accordance with the ammonia and boric acid scheme. The observed phenomena of combination are explicable only upon the assumption of a complex constitution of the diphtheria poison. The facts find their best explanation in the action of a toxone and an epitoxonoid, and the immunizing action of apparently neutralized toxins can thereby be explained. Constituents of the diphtheria with weak affinity after combining with antitoxin may eventually become so firmly bound that this union can only be incompletely broken by toxin of stronger avidity.

Prof. Ehrlich then referred to the experiments of a similar nature made by Dr. Sachs at his suggestion, with tetanolysin. For the latter which is the basis of the investigations of Arrhenius, it was found that similar statements could be applied and therefore that the premises underlying his entire calculations and constructions of graphic curves are inapplicable. The linear representations of the calculated values of toxins as demanded by Arrhenius for all cases, must be rejected whenever the phenomena above noted are present. Allusion was then made to the fact that from the purely physicochemical point of view, the conceptions of the authors presented numerous vulnerable points which would soon be exposed by competent authority. A few opposing arguments of a biological nature were then considered, beginning with tetanus. Tetanolysin on account of its property of decomposing quickly and the difficulty of conducting hemolytic experiments with absolute accuracy, is ill adapted for precise determinations of the kind under consideration. As the lecturer graphically described it, neutralization experiments with this substance encounter on the one side the Scylla of incomplete union and on the other the Charybdis of destruction of the poison. It does not seem comprehensible that the calculations should be based on the assumption that the toxin consists of molecules of poison with uniform composition. On the contrary it is highly probable that specific toxoids are present, which must enter into the calculations as well as the toxins. The amount of toxoid was unknown and is at present indeterminable. To escape from this dilemma, Arrhenius assumes that the production of toxoid results from an equable weakening of all the toxic molecules. Thus the toxic solution would not be a mixture of dissimilar components. This assumption must be rejected on general grounds and is disproven by the demonstration of prototoxoids, as well as by the investigations of Tarobi on ricintoxoids. A number of other objections were also discussed and to meet these, Ehrlich claimed that Arrhenius had scarcely anything of a positive character to offer, except his tetanolysin table, which corresponds fully with the theoretical calculation. It should be emphasized, however, that this favorable result was secured only once in comparison with a large number of failures. What adds to the skepticism is the fact that both of Madsen's diphtheria curves, which were published in refutation of Ehrlich's conceptions, have since been shown to be erroneous. At present there are no satisfactorily demonstrated facts which warrant the application of Arrhenius' conceptions to the diphtheria toxin. The large variations of the dissociation-constants, as determined by the calculation, necessitate the assumption of an extraordinary multiplicity of poisons, whereas Ehrlich's conceptions are satisfied with the conception of a much smaller number.

In concluding this lecture he claimed that his views furnished a far better explanation than those of Arrhenius of numerous facts in the domain of toxins. These include the process of spontaneous enfeeblement of toxins, their passage into a state of stability, the reduction of the toxone zone, and the capacity of completely neutralized poisons to produce antitoxin by means of epitoxonoids. He ended with the conviction that what he had established through long years of work concerning the nature of the diphtheria poison would in the course of time prove itself real and vital.

SOCIETY PROCEEDINGS.

HARVARD MEDICAL SOCIETY OF NEW YORK CITY.

Regular Monthly Meeting, held Saturday, February 27, 1904.

The President, Augustus S. Knight, M.D., in the Chair.

Complete Removal of the Penis.—Dr. Spooner presented a patient from whom the entire penis had been removed because of cancerous disease some three weeks before the meeting. The specimen of cancer was also presented. Notwithstanding the removal of the organ, the patient is able to hold his water perfectly. In answer to a question, Dr. Spooner replied that the muscles involved in holding the urine are the circular fibers at the opening of the urethra and that these are not interfered with by the operation. They constitute the so-called internal sphincter of the bladder and are composed of involuntary muscle fibers. Some voluntary muscle fibers, however, are found along the urethra in the perineal portion, and these of course remain untouched. Hence enuresis does not follow. This compresser urethra muscle is a portion of the levator muscle and effects the purpose of an ailing patient to hold his urine very well, yet gives him control over the evacuation of his bladder a few times.

Rupture of the Intestines.—Dr. Flint presented a case in which, as the result of a blow on the abdomen, severe rupture of the upper part of the small intestine near the beginning of the ileum had occurred. Notwithstanding the usually hopeless outlook of these cases, the patient was operated upon successfully. Within three hours after the accident had happened the ruptured places were sutured, the abdomen thoroughly flushed out and the patient recovered without any serious complication or delay.

In discussing Dr. Flint's case Dr. Putnam said that he had recently operated upon a fireman who had suffered from rupture of the ileum almost at the same part evidently as that in which Dr. Flint's patient had been injured. In this case the result was fatal. At first the patient refused operation, and when, after forty-eight hours, the operation was permitted, he was already in the throes of death from peritonitis and died from shock. In this case the intestines seemed to have been filled with air and to have ruptured somewhat like a paper bag, when by the force of the blow they were driven against the spinal column.

Obscure Stricture of Esophagus.—Dr. F. N. Wilson reported a case in which for several days a child

vomited every particle of food that was given it. This food was vomited in such a way that it had evidently never reached the stomach and a stricture of the esophagus was found to be present. The interesting feature of the case was the absence of history pointing to any possible etiology of the stricture. The child had suffered from scarlet fever some months before and this had evidently been of very severe character, since the little one had been in bed for six weeks. The little one had become so much run down for lack of food that when an operation for the dilatation of the stricture was attempted it died before proper dilatation could be accomplished. The stricture was about 8 cm. from the teeth and there was absolutely no history of irritant materials having been swallowed or any trauma that might have occasioned the stricture which was found to exist after death. There was very little fibrous material associated with it, as could be seen from the specimen which was exhibited. Dr. Frank Daniels said that the stricture was evidently connected with the attack of scarlet fever, since only under very special complications were children in bed for so long as six weeks with this disease. It is difficult, however, to say just what the process which brought it about would be, though as secondary infections are quite common with scarlet fever, the possibility of such a complication with scarlet fever is easy to understand.

Sarcoma Treated by Toxins.—Dr. William B. Coley presented a patient who had suffered some three years ago from a round-celled sarcoma of the dorsal spine. At the time he came under observation he was about twenty years of age. The tumor was of enormous size involving several of the lower dorsal and some of the upper lumbar vertebræ. The patient had lost about fifty pounds in weight. During the growth of the tumor so much pressure had been exerted upon the spinal cord that not only was the patient confined to his bed, but there was total paralysis of the lower extremities as well as of the bladder and rectum. Just before he came under observation the patient was so weak that he was unable to turn over in bed. The diagnosis of sarcoma had been made by Dr. Virgil P. Gibney who called on Dr. Coley to administer the toxins at the Montefiore Home just two years ago. Before the administration of the toxins a small portion of the tumor was removed and the diagnosis of round-celled sarcoma made from the very typical clinical history of the case, which was confirmed by Dr. Harlow Brooks, a pathologist at Bellevue Hospital.

Details of Treatment.—About four drops of the mixed toxins of the bacillus of erysipelas and *Bacillus prodigiosus* were given daily. A temperature of 103 to 104° F. developed after each injection. Almost at once the patient began to show improvement, especially in his general condition, and the local signs, by lessening of the size of the tumor, also improved. Six months after the injections were begun he was able to be around on crutches. In November he was shown before the New York Surgical Society and had regained nearly all the weight that he had lost besides recovering almost completely the use of his limbs, so that he was able to walk very well with the aid of a cane. Last February, one year after treatment had begun, he was able to walk perfectly without support of any kind and his general health had improved to such a degree that he was able to resume his former occupation. Dr. Coley considers this to be one of the most remarkable results ever obtained from the use of the toxines. Of the diagnosis in the case there can be no doubt, since specimens from the tumor were examined by thoroughly competent pathologists and some of these specimens are still to be seen by those who might have any possible doubt about the nature of the affection.

Other Favorable Results.—Dr. Theodore Dunham said that the patient presented by Dr. Coley was the most remarkable one that he had seen with the exception of a patient under the care of Dr. Abbe some time ago which seemed absolutely hopeless. The growth was an enormous tumor on the side of the head. The toxins when administered produced a decided reaction and the growth of the tumor, which had been very rapid before, stopped at once. Before long the tumor began to reduce in size and then practically disappeared. Dr. Dunham has seen the child several times since, and the cure seems to be enduring.

Dr. Dowd said that while the toxins did not succeed in all cases, he had seen some remarkable results that had been thus obtained and he considered that further observations along this line should be made, especially in the severest cases, in order to obtain further data as to the value of this method of treatment.

Relief of Paralysis.—Dr. Frank Daniels said almost more surprising than the cure of the tumor itself was the complete restoration to the patient of the use of his limbs and his urinary and rectal functions after five months of pressure paralysis with involvement of both bladder and rectum. Usually it is considered that in this length of time some degeneration will have taken place in the nervous fibers of the cord, and the present excellent condition of the patient is therefore a subject for congratulation and the source of the greatest encouragement as regards the possibilities of these cases to get well.

Inhibitory Action of Toxins.—Dr. Coley said that in very many cases of sarcoma the mixed toxins of erysipelas and of the *Bacillus prodigiosus* produce a distinct inhibitory action upon the further cellular growth of the neoplasm. In some cases, however, this inhibitory action is not quite equal to the new growth of the tumor, and consequently the toxins fail to give relief. When the malignant neoplasm is extremely active the toxins therefore may prove unavailing. In most cases, however, the toxins inhibit the growth of the tumor for a time at least. In not a few cases this inhibitory action is so marked that the tumor begins to grow less in size at once and as the general condition of the patient is dependent apparently upon toxins absorbed from the neoplastic cells, this soon begins to improve. There can be no doubt now, in the mind of any one who has followed cases of sarcomata treated by the toxins, that they are wonderfully curative under favorable conditions. Dr. Coley has now had twenty-four cases which have been well from two to ten years. Sixteen of these cases have been well from five to ten years. One died of local recurrence at the end of eight years. One of local recurrence after two and a half years, and one of abdominal metastases after having remained well for over three years.

Treatment of Cicatricial Esophageal Stricture.—Dr. Theodore Dunham said that he suggested some years ago, in a paper read before the Harvard Society, certain methods of securing the passage of a thread through an esophageal stricture for the purpose of having instruments, guides and the like find their way through tightly closed strictures of the esophageal wall. As is well understood, it is important to reduce the danger always present in operations for dilatation of the esophagus by the passage of a guide from either side, that is, whether the stricture is to be dilated from above downward, or from the stomach upward. It is not always possible, however, to pass even a flexible guide through the tortuous strictures that exist in the

esophagus. If, however, fluid can find its way through the stricture, Dr. Dunham has shown that a thread may readily be washed through even the smallest strictures and then as gastrostomy is done, the thread may be used to draw a larger piece of cord or a piece of rubber tubing that may aid in the dilatation of the stricture, or may be useful in many ways in facilitating further operative procedures looking to the relief of the patient by making the stricture passable.

Thread Through Nostril.—In cases in which the patient is for instance a young child and the tongue prevents the passage of the thread, or where in adults a certain nervousness causes the tongue to interfere with its passage, the thread may be washed through the nostril. This Dr. Dunham tried first on himself and found that it was not accompanied by any serious discomfort and he now uses it, confident of success, where sometimes before much time was wasted in getting the thread through the mouth. The most important element in having the thread flow properly through the tube, is to have it as far as possible, perfectly straight. No slack must be allowed, and the flow of the thread must be checked every few moments in order to prevent any snarling. Others who have tried to wash threads through narrow strictures have been of the opinion that if some small heavier object were placed at the end of the thread it would be carried along more readily by the stream of water. This is not true. The more flimsy the thread the better does it flow in narrowing tubes, and the better is it kept in the center of the stream where movement is most rapid and there is least likelihood of its movement being interfered with.

Cord as Dilator.—Once a small string has been passed through a tight stricture, it may be hooked out of the stomach through the gastrostomy opening with a bent probe. A larger cord may then be drawn down, and, adopting the suggestion of Dr. Agbey, this cord may be used by means of a saw motion to affect an enlargement of the path through the stricture. Cutting with the cord thus, seems to be reasonably safe. The mouth and the gastrostomy opening have to be protected while the sewing is done by means of bent, grooved, metallic instruments in order to avoid the occurrence of unnecessary lesions. Besides the cord, an olive pointed instrument may be drawn through the stricture thus further dilating it. Dr. Dunham has had a series of olives made in order to secure gradual dilatation. At times Dr. Dunham has found that the drawing of a piece of tubing, which is put on the stretch, through the stricture, and then allowed to become thicker by its elasticity after it is in place, will affect a very gradual dilatation of the stricture, though not infrequently it will be found that this does not remain in place, but is gradually worked out by movements of the tissues.

Illustrative Cases.—Dr. Dunham reported a series of illustrative cases, two of them operated upon by himself, and some seven others reported to him by other surgeons who have found his methods very useful in securing the dilatation of esophageal strictures. In the first case in which he found the washing of a thread into the stomach the only possible means of securing dilatation of the stricture, he failed on three separate occasions to find the cardiac orifice of the esophagus to go through a gastrostomy wound in spite of the most careful search. In this case from neglect the dilated stricture became closed up once more and the patient refused to drink the water necessary to secure the passage of the thread into the stomach. It was then that Dr. Dunham, after having first tried it through his own nose, succeeded in washing the thread into the stomach by means of the tube passed along the floor of the nostril. Dr. Dunham has found that while at first it seemed more advisable to do the operation without an anesthetic, anesthesia is preferable, for the manipulations are very painful and the operator is apt to be discouraged by the complaints of the patient from accomplishing such an amount of dilatation as will really prove effective in lessening the symptoms present in the case.

Points in Technic.—Dr. George Brewer said that no operation is more trying to the surgeon than dilatation of a tight esophageal stricture. One of the most serious difficulties with regard to the passage of sounds through a stricture is that where there has been a decided narrowing of the esophageal lumen for a considerable period there is almost sure to be a diverticulum of the esophagus formed just above it. If sounds are passed then they will almost inevitably find their way into this diverticulum and the use of any force to pass sounds will surely lead to fatal results by perforation of the diverticulum with infection of the thoracic tissues. Hence the necessity so often for dilatation from below. Where the stricture is very tight, however, and close to the cardiac orifice, it is often a difficult matter to secure the entrance of instruments. Dr. Dunham's method of passing a thread then, is extremely helpful and saves a very difficult and almost impossible situation. Instead of using grooved pieces of metal to protect the soft parts, when a cord is employed with a sawing motion to enlarge the stricture, Dr. Brewer has found that a large, long spatula makes a better guard for the mouth, at least. It must not be forgotten that several strictures may exist in the esophagus and Dr. Brewer on one occasion had the olive-pointed tip of an instrument catch on the shoulder of a stricture through which it had passed and remain below the strictures some 15 cm. from the teeth imprisoned between two strictures. It was hard to know what would be necessary in order to secure its removal. A thoracotomy from behind was thought of, or the possibility of securing it by operating from the cardiac end of the stomach. Dr. Brewer succeeded, however, in making a cup-shaped snare which caught the olive and carried it with it in its course between the strictures.

Element of Spasm.—Dr. Dowd said that the element of spasm in esophageal strictures must never be forgotten. It not infrequently happens that when the specimens are obtained from a case of serious stricture of the esophagus, they are found not to contain much fibrous tissue, nor to have been especially thick and tight. It is evident in these cases that the irritability of the muscles near the point of stricture easily set up spasm and that this shuts up the narrowed lumen of the esophagus completely, though there was actually not a stoppage effected by the stricture itself. Hence the story so often seen on hospital sheets with regard to patients suffering from stricture of the esophagus not being capable of permitting the passage of a sound on the first day, and yet allowing it to pass easily afterward.

Technical Details.—Dr. Putnam said that the passage of the thread required attention to details. A little water was better than much. The thread has to be kept well on the stretch and the operator must remember that just when he is sure that the thread is down a gush of water may bring it out once more.

Dr. Brewer said that in one patient in whom he had attempted to pass the thread, the patient did not care to try to swallow it in the usual way with water, but taking a mass of thread he chewed and swallowed it, and actually succeeded in getting portions of it into the stomach.

Treatment of Spasm of the Esophagus.—Dr. Egbert Grandin said that for the treatment of a spasm of the intestines atropine or hydrobromate of hyoscine were

very effective. In the cases after operation within the abdomen when paresis of the gut occurs, these remedies, if given to their physiological effects, often give good results. It would seem worth while then to employ them as tests of the existence of spasm in these cases so as to be sure that there is real pathological condition as well as the spasm present.

NORTHWESTERN BRANCH OF THE PHILADELPHIA COUNTY MEDICAL SOCIETY.

Regular Monthly Meeting, held March 10, 1904.

The President, Samuel Wolfe, M.D., in the Chair.

A GENITO-URINARY SYMPOSIUM.

The Local Treatment of Gonorrheic Infections.—Dr. H. R. Loux read this paper. He stated that, although a continuous service of eleven years in one of the largest genito-urinary clinics in America had afforded him unusual opportunities for observation, he had never written a paper upon the treatment of gonorrhea, because no method heretofore suggested proved, upon prolonged trial, to be an advance worthy of commendation. Clinical observation in thousands of cases convinced him that gonorrhea is too often grossly mistreated. He deprecated the use of strong, irritating injections because they aggravate the disease and damage the urethra, and stated that treatment of acute anterior urethritis by irrigation is to be condemned because it causes an extension of the disease by continuity; he quoted statistics, reasons and authoritative statements to show that these opinions represented the beliefs of the leading and most conservative genito-urinary surgeons. The speaker stated that during the past year and a half the results at his clinic at the Jefferson Hospital and in private practice, had been much better than ever before; this statement he based upon the observation of several thousand cases of gonorrhea at all stages. The reasons for this improvement he ascribed to careful local treatment in which he abandoned, absolutely, the use of any drug as an injection which can cause the slighest irritation. Dr. Loux stated that, in a general way, his methods of treatment were as follows: For acute gonorrhea, he prescribed light diet, with very little meat, no fats, fruit or alcoholic beverages, but allows as much skimmed milk as the patient can drink. If the infection is confined to the anterior urethra, he prescribed the injection of two drams of a ten per cent. solution of argyrol, held in the urethra ten minutes; this injection is made in the morning, at noon and at night. Internally, he prescribes capsules of copaiba, cubebs and sandalwood three times daily. This treatment is practised for one week, during which time the discharge will almost if not entirely cease, there will be no pain or irritation by the injection or upon urination, and the gonococci will disappear. If, at the end of one week, the urine remains continuously shreddy, a weak solution of astringents is employed and of these drugs he preferred zinc sulphate, iodide, chloride, hydrastin or berberine muriate, but emphasized that these astringents should not be used during the first week of the disease and never in solutions sufficiently strong to produce pain or irritation. If the two-glass test shows cloudy first and second portions of the urine, showing the presence of anteroposterior urethritis, he irrigates the anterior urethra with a warm solution of boracic acid in order to remove the accumulated secretions. Then he makes deep instillations of twenty per cent. argyrol solutions once daily or on alternate days; the inflammation of the anterior urethra is treated in the manner already described. The writer quoted from statistics of 400 cases treated since July, 1902, by the methods described and stated the advantages as follows: simplicity; the relief afforded the patient from pain and irritation; the extreme rarity of complications; shortened duration of diseases, in that an average time required for cure in acute cases was twenty-one days, whereas by the older methods practised at the clinic and in private work, the best average obtainable was forty-two days.

Dr. Loux then discussed the treatment of gonorrhea in the female, the methods of which are best described by an illustrative case: A. G., aged twenty-one years, came under observation June 5, with acute vaginitis, endometritis and urethritis for which she had been under treatment in New York for one week. Typical symptoms of gonorrhea were present; microscopical examination positive. The vagina was dilated to full extent by means of speculum. To every portion of the vaginal mucous membrane a 50 per cent. argyrol solution was applied, and the same to the urethra by means of a cotton-tipped probe. The interior of the uterus was then freed of accumulated secretions by means of a cotton-wrapped applicator, after which the 50 per cent. argyrol solution was applied to the cervix and the body of the uterus. These applications are repeated two or three times, so as to fill the uterine cavity with the solution. This local treatment was carried out every second or third day. After eight days no gonococci could be found. For home treatment the patient was ordered vaginal douches of from 2 to 4 quarts of hot boracic or normal salt solutions taken in the recumbent posture. On June 20, there was no discharge or other symptoms of gonorrhea and the patient was discharged. On June 29 she was attacked with acute appendicitis, for which he operated and removed a sloughing appendix. For the subsequent five weeks, during which she was in bed in the hospital recovering from the operation, he made observations every few days of her genito-urinary organs and there was no symptoms of gonorrhea. The patient made an uninterrupted recovery and left the hospital. In discussing chronic conditions which result from a neglected or improperly treated gonorrhea, Dr. Loux stated that care should be exercised in adapting methods and means to avoid irritating the already damaged urethral structures. He emphasized the necessity of making routine use of the endoscope and determine its nature. Chronic follicular urethritis is readily recognized by endoscopic examination and by palpation of the enlarged follicles over a bougie, and is treated by gradual dilatation of the urethra by means of bougies, massage of the enlarged follicles, and by the local application of 25 to 50 per cent. argyrol solution to the individual enlarged follicles as revealed by the endoscope. This treatment is carried out three or four times a week and is by far the most satisfactory method he had ever found. Most cases of chronic gleet are due to ulcerative conditions of the urethra and in the management of these the endoscope is indispensable. After determining the exact location of the individual ulcerations the method of treatment depends upon whether the ulcerations are sharply localized or whether there is a coexistent general hyperemia of the urethra. In the former case, applications of 50 per cent. argyrol solution (through the endoscopic tube) to the ulcerations should be made at least three times a week. If general hyperemia exists, the use of mild astringents should precede the topical application of argyrol, in order to rid the urethra of the mucopurulent accumulations. From four to six weeks of this treatment, with care in the use of instruments, will heal the ulcerations and cure the gleet in the large majority of cases.

Another very common condition is the reduction in the lumen of the urethra by inflammatory exudate, occasioned by repeated attacks of gonorrhea or a primary case of long duration. In these cases, endoscopic examination shows the seat of beginning stricture and the presence of more or less localized inflammation. The management of these cases is extremely important because of the certainty of the occurrence of organic stricture unless the patient agrees to a several weeks' course of treatment. He should report every third or fourth day for the passage of bougies of gradually increasing sizes, followed, if active inflammation exists, by the deep instillation or topical application of 25 per cent. argyrol solution, depending upon whether the inflammation is circumscribed or more or less diffuse.

Dr. Loux summarized his paper as follows: Concerning acute gonorrhea, (1) he would strongly deprecate the treatment of acute anterior urethritis by means of irrigation, because of the danger of spreading the disease to the posterior urethra; (2) irritating injections of any kind should never be used in acute gonorrhea because of the certainty of occurrence of a mixed infection and the extension of the disease, by contiguity, to the urethral follicles; (3) argyrol, as a non-irritating gonocide, with a specific effect in allaying the symptoms of inflammation, is the drug of choice for injection, and may be used in any strength and at any stage of the disease; (4) astringents, such as zinc, hydrastin, bismuth and lead, should never be used in the acute stage of gonorrhea, but should be reserved for the post-gonococcus period when the urine remains shreddy; (5) these astringents should not be used in sufficient strength to cause the patient to experience pain or irritation. Concerning chronic gonorrhea: (1) Endoscopic diagnosis and treatment are indispensable as a routine measure; (2) silver nitrate or other caustic or irritating applications or instillations should be seldom used, and then only in the most skilled hands and with the greatest care; otherwise there are likely to occur structural changes in the urethra, predisposing to organic affections amenable only to surgical procedure.

The discussion of Dr. Loux's paper was opened by Dr. H. M. Christian, who stated that the methods mentioned were, in the main, those practised by himself. He stated that potassium permanganate is of no value in gonorrhea other than as a simple cleansing agent. Dr. Christian agreed with Dr. Loux that argyrol was undoubtedly the best gonocide known to-day. After having used that silver salt continuously for more than two years, he prefers it because it never irritates, it is rapidly destructive to the gonococci, lessens the discharge and shortens the duration of the disease. The speaker stated that it must be borne in mind that one has to deal not only with the gonococci, but with the destructive action of the microorganism as well; in other words, destruction of the gonococcus does not by any means imply of necessity the cure of the disease, as there always remains a condition of catarrhal urethritis which requires a particular line of treatment. If a case of gonorrhea is seen in the early inflammatory stage, where ardor urinæ and chordee are the most annoying subjective symptoms, Dr. Christian orders powders containing salol, sodium bromide, potassium bromide, each 2½ grains every two hours. At the same time a 5 per cent. solution of argyrol is ordered to be used by the patient as a hand injection three or four times daily, the solution being held in the urethra for ten minutes. If the patient can spare the time it is advisable to wash out the anterior urethra with several syringefuls of warm normal salt solution prior to using the argyrol injection; this line of treatment can be carried on through the second and third week. When the subjective symptoms subside, it is sometimes of considerable advantage to supplement the local treatment with the use internally of copaiba and sandalwood oil. Ordinarily at the beginning of the third week, the patient enters upon the stage of decline, or, as Professor Finger styles it, the "mucous terminal stage" of the disease. In a case going on to recovery, the discharge is now scanty, then mucopurulent in character and containing few if any gonococci and this is by far the most important stage in the treatment of the disease as regards the patient's future welfare; it is here that experience teaches that one needs more than a mere gonoccidal agent. In addition mild astringent lotions are needed to help restore the integrity of the damaged mucous membrane. A good plan now is to use 5 per cent. solution of argyrol night and morning, employing through the day some such astringent as zinc, bismuth, hydrastic, lead, berberine, etc. At the beginning of the fifth week when nothing remains but the well-known "morning drop" and the urine is clear but contains shreds, it is well to use the argyrol solution at night and to use once or twice through the day one of the well-known astringent mixtures. If in the second or third week the clinical symptoms and the two-glass test show involvement of the whole urethra, the treatment by hand injections is temporarily abandoned. Deep instillations of ten per cent. solutions of argyrol are then employed at short intervals until such time as the second urine becomes clear. This in general is the line of treatment that the speaker had used at the University of Pennsylvania and his other clinics for the past two years and is one that has given more satisfactory results than any hitherto employed.

Dr. Orville Horwitz condemned the irrigation treatment of gonorrhea and summarized his opinions as follows: The irrigation method of treatment will not abort acute specific urethritis; chronic urethritis and involvement of the deep sexual organs are common sequences; in many instances, in order to effect a cure in the terminal stage of the disease, the irrigation must be discontinued and other methods of treatment employed; irrigation should not be employed in the acute stage of specific urethritis; irrigation of the deep urethra by means of hydrostatic pressure is injurious in the majority of cases of acute gonorrhea, and is conducive to the development of complications; the best treatment today for gonorrhea is that by means of injection of argyrol solutions which are strongly antiseptic and non-irritating.

Dr. R. O. Kevin prefaced his remarks with the statement of the French surgeon Ricord, that "A clap begins and God alone knows when it will end." Fortunately, however, this statement is not as true as it was a few years ago. Dr. Kevin stated that with the use of twenty per cent. argyrol solution he had been able to cure 85 per cent. of his acute cases in from two to four weeks. He quoted Purdy, of London, who stated that since the introduction of argyrol into the enormous clinic at the London Lock Hospital, seventy-two per cent. of the early cases had been cured within a month and there had been no relapse after six weeks. Dr. Kevin had been associated with Dr. Loux for several years at the clinic and could corroborate his conclusions. The speaker stated that he had seen so many acute cases cut short that he always practised the abortive method when possible; this method is as follows: If the patient presents himself during the first forty-eight hours of an attack of gonorrhea, the anterior urethra is washed out with warm water or normal salt solution. Then two drams of twenty per cent. argyrol solution is injected into the anterior urethra and held there for ten minutes; this injection is repeated by the patient every three

hours, night and day, for three days. Even if this method does not abort the disease, it always effects a cure in a shortened period, and affords the patient entire freedom from the pain and irritation usually present in an early gonorrhea. If by this means the disease does not show signs of being aborted, Dr. Kevin practises the same methods mentioned by Dr. Loux.

The Radical Cure of Senile Hypertrophy of the Prostate.—Dr. Orville Horwitz read this paper, which is based upon a study of 145 operations performed by himself. He stated that the question under discussion has, with the possible exception of appendicitis, attracted more attention in the surgical world than any other subject. It is well-recognized that the danger to the patient with enlarged prostate begins as soon as it is necessary to resort to the daily use of the catheter and when this period arrives a surgeon should be consulted to supervise the case and decide what operative measures are desirable or necessary. It was emphasized that no one operation was suitable to all cases and that each patient is a law unto himself in the matter of choice of operation. The two operations which have stood the test of experience are prostatotomy by means of the galvano-cautery (the so-called Bottini operation) and prostatectomy. The speaker stated that the Bottini operation is extremely valuable, safe and always to be preferred to cutting operations in suitable cases. Out of 98 cases operated upon by the author, by the Bottini method, three died, two of uremia, and one of sepsis; all three were very old men. Twelve cases were lost sight of after leaving the hospital but were much improved when last examined. This leaves 81 cases concerning which there was obtained definite knowledge as to results. The ages of the patients varied between fifty-two and eighty-one years. The speaker stated that his statistics proved conclusively that the earlier the patient submitted to operation, the better the results. Of the total 81 Bottini operations all the patients were either entirely cured or very much benefited; four required second operation, and a considerable proportion were treated for several months subsequently for accompanying chronic cystitis. Prostatectomy, the speaker stated, is regarded as a valuable operation but authorities differ as to when and how it is to be performed. As many as 20 different operations have been suggested. Here, too, the individual case decides methods, choice of operation, etc. The prostatectomies performed by the author were as follows: 3 complete (suprapubic incision); 6 complete (combined suprapubic and perineal incisions); 7 partial prostatectomies (suprapubic incision); 34 complete perineal prostatectomies. Of the 9 complete suprapubic operations, two died, one of suppression of urine, one of uremia. In all the cases, convalescence was slow; in five cases the ultimate results were all that could be desired. Of the 34 perineal prostatectomies, six died from uremia, sepsis or shock; 6 cases were lost sight of after leaving the hospital; 16 were cured, four markedly benefited, one unimproved.

Dr. Horwitz summarized the results of observations in his 145 operations as follows: (1) A routine method is not applicable to the treatment of prostatic hypertrophy; every case is a law unto itself and the treatment will depend on the various conditions presented in each individual case. (2) The dangers attendant on the daily catheterism are greater than those of a radical operation performed at the onset of the symptoms caused by the obstruction. (3) The proper time to perform a radical operation is reached as soon as it becomes necessary for a patient to resort to daily catheterism. (4) The gratifying results obtained by a number of the operations in many cases demonstrates that the Bottini operation is one of great surgical value. It is applicable to a large percentage of cases; which if properly selected has proved to be the safest and best method of relieving an obstruction caused by prostatic hypertrophy. In those cases in which a stone in the bladder is associated with a prostatic enlargement, lithoplaxy may be performed in conjunction with a galvanocautery prostatotomy. (5) A complete prostatectomy is justifiable if performed early before the individual is broken down in health and secondary complications have supervened. In early operation the results are most satisfactory, recovery rapid, the mortality varying between five per cent. and seven per cent. (6) A complete prostatectomy in feeble elderly patients with long-standing obstruction and secondary complication, the prognosis is grave and the mortality ranges between 15 per cent. and 18 per cent. If the bladder in the cases happen to be hopelessly disabled, the results obtained by the operation are negative. Cases of this description are only suitable for suprapubic drainage. (7) In 90 per cent, of all cases the gland can be readily removed by means of a medium perineal incision. The perineal operations recommended by Bryson is considered the operation of choice. (8) Complete suprapubic prostatectomy is shown to be more dangerous than the perineal operation for obvious reasons. A suprapubic prostatectomy is safer if combined with perineal drainage. (9) Partial suprapubic prostatectomy is indicated in such cases as where a valve-like lobe exists which interferes with urination, or where there is a partial hypertrophy of one of the lobes. (10) A perineal prostatectomy is best suited for those cases where the enlargement of the lateral lobes has a tendency to progress toward the rectum, to obstruct the urethra, or project backward into the bladder. (11) A prostatectomy is always attended with more danger than the Bottini operation and the convalescence is more prolonged. In suitable cases the latter operation is therefore the one of choice.

Dr. Edward Martin agreed with Dr. Horwitz that, if operation has been advised and consented to, the circumstances of the individual case decided which of the several operations is to be performed. He believed that the Bottini operation has proved of great value and is preferable to cutting operations in suitable cases. He did not, however, advise operation in all cases of enlarged prostate. He recognized the inconveniences and dangers attendant upon the daily use of the catheter, but believed in the value of palliative measures in the majority of cases. He recommended care in the selection of catheters and chose one that enters the bladder with the least force and least pain to the patient. If a soft rubber catheter cannot be introduced, a woven elbowed one is to be chosen. If obstruction or spasm necessitates habitual resort to a metal catheter, surgical intervention is required. When patients use the instrument upon themselves, the hands should be washed thoroughly, dipped in bichloride solution, the meatus washed with the same solution, and be provided with an irrigating bag containing one pint of hot argyrol solution, 1 to 1,000. Infection of the bladder is commonly present and should be treated by means of bladder irrigations. For this purpose a fountain syringe, supplied with a catheter, should be suspended two feet above the level of the bladder. The anterior urethra is first thoroughly flushed, after which the catheter is pushed into the bladder and the urine withdrawn. The flushing of the bladder is continued until the return flow no longer contains pus or mucus. The temperature of the argyrol solution employed should be of the temperature of the body or a little above it. When practicable this antiseptic flushing should be done each time the catheter is passed. If this treatment is inefficacious continuous catheterization becomes necessary. For this purpose a

large, soft rubber catheter, or a self-retaining one, is selected and the antiseptic solution introduced; if the catheter is properly introduced, the entire amount of the solution will return. Twice a day the urethra and bladder are thoroughly flushed with the antiseptic solution, the catheter being withdrawn far enough to allow the injected fluid to escape from the meatus, and then being pushed back into its former position. The success of this treatment depends upon securing free and continuous drainage and this is incident to the permeability of the catheter and its retention in the proper position. When skilfully applied it is one of the safest and most successful means of treating cystitis, which so frequently complicates obstruction from prostatic enlargement.

BOOK REVIEWS.

Subjective Sensations of Sight and Sound, Abiotrophy and Other Lectures. Second Series. Lectures on Diseases of the Nervous System. By Sir William R. Gowers, M.D., F.R.C.P., F.R.S., Hon. Fellow Coll. Phys., Ireland; Member of the Soc. Medicins Russes of St. Petersburg and of the Royal Soc. of Science of Upsala, etc. P. Blakiston's Son & Co., Philadelphia.

It is almost needless to say that this series of lectures is extremely interesting and suggestive. No one can read any of them without being stimulated to the making of observations for himself along similar lines, and that, rather than the mere feeling of information acquired, is the true test of the value of a medical essay. For the specialist in mental diseases the essays on Subjective Visual Sensation and Subjective Sensation of Sound will prove particularly valuable. The essay on Syphilitic Diseases of the Nervous System, thoroughly conservative as it is, enunciating certain principles that are of the greatest practical usefulness, deserves to be read not only by the specialist in nervous diseases, but by every general practitioner, for, unfortunately, the beginnings of syphilis of the nervous system must be seen and treated by the practitioner first and are only too often missed or neglected. It is interesting to find that Sir William does not believe either in the large doses of some of the American school or the prolonged treatment of the French school of Syphilologists, yet his conservatism is supported by excellent reasons.

A Manual of Medicine. Edited by W. H. Allchin, M.D.Lond., F.R.C.P., F.R.S.Ed., Senior Physician and Lecturer on Clinical Medicine, Westminster Hospital, etc. Vol. 5. Diseases of the Digestive System and of the Liver; Diseases of the Peritoneum and of the Vessels of the Abdomen; Diseases of the Kidneys; Diseases of the Ductless Glands. The Macmillan Company, New York.

We have already spoken of the extremely handy size of the volumes in Dr. Allchin's Manual on Medicine. Cumbersome tomes may be absolutely necessary at times, but they certainly are not convenient. The present volume contains especially the diseases of the digestive organs. Special attention is paid to the mouth and its various affections, an important area of the digestive tract, since the impression has gained ground that there is much more danger from neglecting pathological conditions in the mouth than was formerly thought. With regard to the three conditions, vomiting, diarrhea and constipation, which physicians are oftenest called upon to ascertain the meaning of and to treat, there are twenty very practical pages typical, one would say, of the English direct, concise, yet complete method of dealing with such subjects.

Besides disorders of digestion other affections of the abdomen are treated in this volume. Recent progress with regard to the diseases of the liver and of the kidney is brought out admirably. Considering that all of this material is crowded into less than seven hundred comparatively small pages, it is surprising to find how little of the sensation of crowding or hurriedness is experienced in reading the volume. The condensation necessary to accomplish this has been done very, very well, and Allchin's Manual promises to make for itself a definite place in English-American medical literature.

The American Pocket Medical Dictionary. Fourth Edition. Edited by W. A. Newman Dorland, M.D., Assistant Obstetrician to the Hospital of the University of Pennsylvania. W. B. Saunders & Company, Philadelphia, New York, London.

The appearance of the fourth edition of this invaluable work hardly needs extended review, but it would be impossible to pass it by without adding a tribute to its worth and excellence. In its new form it will be found more useful than ever before, and those few members of the medical profession who have been able to dispense with it in the larger edition can hardly fail to feel the need for such a handy volume. Not only is its text accurate and up-to-date, its illustrations copious and a real illumination to the reader, often sorely perplexed by misleading pictures and diagrams, but its appearance is so attractive and its size so convenient that we feel sure there will soon be many to declare that they "could not keep house without it."

Biochemical Researches. Collected Reprints of Publications from the Laboratory of Physiological Chemistry of Columbia University. By William J. Gies and collaborators. Vol. 1. Columbia University.

Some 40 reprints are here brought together, with some published abstracts of preliminary reports of investigators into a highly representative volume that reflects great credit upon the editor.

The papers have appeared in scientific publications and it is a great service that is here rendered in their collective binding. We hope that Dr. Gies may continue to be the stimulus for younger men in work in physiological chemistry and that he may be able to further the cause of scientific medicine by other volumes from his laboratory.

Auto-Intoxication. Part IV. of Clinical Treatises on Disorders of Metabolism, Pathology and Therapy. By Carl Von Noorden, Physician-in-Chief to the City Hospital Frankfort-A.-M., Germany. E. B. Treat & Co., New York.

In this little volume Professor Van Noorden has once more proved his originality in the handling of a difficult but important subject. The phases of auto-intoxication treated are those connected with the acid products of metabolism, especially in diabetic conditions. Those who are interested in diabetes will find interesting and suggestive discussions of the sources of the acetone bodies, and of the question, Where are the acetone bodies formed? While suggestive, some of this work must wait for confirmation at the hands of other observers.

Elements of Surgical Diagnosis. By A. Pearce Gould, Surgeon to the Middlesex Hospital, etc., London. Third edition. W. T. Keener & Co., Chicago.

For the third edition of this practical little work, the whole text has been revised, much has been rewritten, and many additions have been made with the hope of

adding to its usefulness. The revision has taken into account how much the art of surgical diagnosis owes to the advances in the knowledge of bacteriology, skiagraphy and hematology. In addition to other material a chapter has been added on the diagnosis of certain acute abdominal diseases for which surgical aid is now sought. The author has separated the diagnosis of injuries from that of diseases, as it seems to him to possess the advantage of greater simplicity, although not in strict accordance with the ways of nature. The only omission is the total lack of illustrations. The work is well written, in a concise pointed style and thoroughly covers its allotted field. The index is complete and satisfactory.

THE AMERICAN YEAR-BOOK OF MEDICINE AND SURGERY. A yearly Digest of Scientific Progress and Authoritative Opinion in all Branches of Medicine and Surgery, drawn from Journals, Monographs, and Textbooks of the Leading American and Foreign Authors and Investigators,-collected and arranged with critical and editorial comments by J. M. BALDY, M.D., SAMUEL HORTON BROWN, M.D., J. CHALMERS DA COSTA, M.D., W. A. NEWMAN DORLAND, M.D., GEORGE FETTEROLF, M.D., JOHN H. GIBBON, M.D., VIRGIL P. GIBNEY, M.D., C. A. HAMANN, M.D., BARTON COOKE HIRST, M.D., D. BRADEN KYLE, M.D., WALTER L. PYLE, M.D., J. HILTON WATERMAN, M.D., under the general editorial charge of GEORGE M. GOULD, M.D. Surgery. W. B. Saunders & Company, Philadelphia, New York and London.

THIS volume covers the field of Surgery, Obstetrics, Gynecology, Orthopedic Surgery, Ophthalmology, Diseases of the Nose, Throat and Ear and Anatomy, giving a summary of the more noteworthy advances and discoveries made during the past year and does more than is usual in such works, to give the profession a clear idea of what is of real value in recent medical literature of the world. More than half the space is given to General Surgery, and while references are made to the original publications, thus enabling one to follow up more in detail any subject discussed, it is a pleasure to read the reviews given and to get a tangible idea of the investigators' work. In many instances the technic of operative procedure is given in full with citation and complete analyses of cases treated and the author's conclusions therefrom, thus rendering it unnecessary for the general reader to pursue further the subject under consideration.

The same statements are true of the other subjects treated, so that we regard the volume as an exceedingly valuable addition to the library of any who wish to become well informed in the most advanced methods of treatment by acquiring a knowledge of what has been done along advanced lines of investigation.

It is a well bound volume and the illustrations, excellent and well chosen, greatly enhance the value of the text.

A REFERENCE HANDBOOK OF THE MEDICAL SCIENCES. By Various Writers; Edited by ALBERT H. BUCK, M.D., Vol. 7. Sac-Ulc. William Wood & Company, New York.

IN sight of the end of this admirable reference work—a library in itself—we congratulate, editor, contributors and publishers alike on the successful accomplishment of a truly remarkable task. Synonyms fail us in further praise of the Handbook. Six times have we given the work unstinted commendation and we lack appropriate phrases to give it again in new form.

Some attention may be called to a few of the articles that are specially commendable. Such are those on Secretion, Septicemia and Pyemia, Serum Diagnosis and Therapy, Sewerage, Sexual Organs, Spectacles, Spermatozoa, Spinal cord and its Diseases, Spine, Spleen, Stomach, Sympathetic Nervous System, Syphilis, Teratology, Trematoda, Tuberculosis, Tumors and Typhoid Fever. These are among the more important longer articles, but many of the shorter articles are entitled to equal characterization.

A PRACTICAL TREATISE ON NERVOUS DISEASES. By S. SAVARY PEARCE, Professor of Nervous and Mental Diseases in the Medico-Chirurgical College of Philadelphia. D. Appleton & Company, New York and London.

THIS work should be classed as one of the many smaller manuals of the purely descriptive type that are of great service to the student-body in their initial introductory to the study of nervous diseases. As such we believe that it will serve a very useful function.

For the practitioner, however, and even for the more thorough class of student, we do not think it as well adapted as many other works of the same class and description. We make this comment because of the fact that the work strikes us as incompletely thought out. There is a lack of logical continuity in the mode of descriptions. Many related diseases being separated, even in different chapters—and many unrelated disorders being considered in sequence.

The value which the anatomical structure of the nervous system makes logical arrangement of symptom-complexes possible is here, we believe, entirely lost sight of—making, to our mind, a nervous hodgepodge rather than a consecutive handbook.

A COMPEND OF GYNECOLOGY. By WILLIAM H. WELLS, M.D., Chief of the Gynecological Staff of the Mount Sinai Hospital, Philadelphia; Demonstrator of Clinical Obstetrics in the Jefferson Medical College, Philadelphia; etc. Third Edition Revised, Enlarged with 145 illustrations. P. Blakiston's Son & Co., Philadelphia.

THE value of this most excellent little quiz-compend is established by the fact that it has successfully entered its third edition. A section on the general therapeutics of gynecology has been added in this edition, thereby making it a most complete publication of its kind.

Many new plates have been inserted and, contrary to the usual illustrations in quiz-compends, they are explanatory rather than puzzles to the students.

We can most heartily recommend this little compend as a helpful adjunct to the gynecological text-books.

BOOKS RECEIVED.

The MEDICAL NEWS *acknowledges the receipt of the following new publications. Reviews of those possessing special interest for the readers of the* MEDICAL NEWS *will shortly appear.*

LA TORSION DU CORDON SPERMATIQUE. Lr. LaPointe. 12mo, 180 pages. A. Mallione, Paris.

OBSTETRICS FOR NURSES. By Dr. J. B. DeLee. 8vo, 460 pages. Illustrated. W. B. Saunders & Co., New York, Philadelphia and London.

PROGRESSIVE MEDICINE. March 1, 1904. 8vo, 338 pages. Illustrated. Edited by Dr. H. A. Hare. Lea Brothers & Co., New York and Philadelphia.

SYSTEM OF PHYSIOLOGIC THERAPEUTICS. By Dr. S. S. Cohen. Volume 7. Mechanotherapy and Physical Education. By Drs. J. K. Mitchell and L. H. Gulick. 420 pages. Illustrated. P. Blakiston's Son & Co., Philadelphia.